

# *The Commercial Car Journal*

VOLUME XXIV

PHILADELPHIA, JANUARY 15, 1923

NUMBER 5

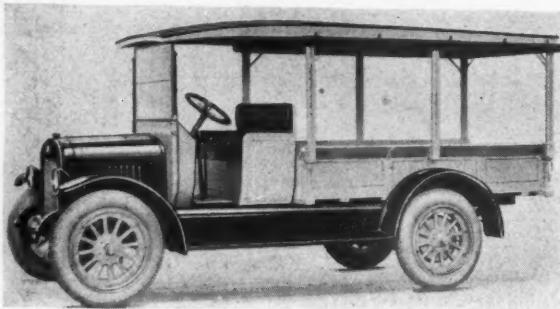
## INTRODUCING THE — 1923 — MOTOR TRUCK SHOW

**¶ THE ONLY NATIONAL MOTOR TRUCK SHOW OF THE YEAR.**

**¶** Dedicated to the Dealer and the Motor Truck Salesman who is desirous of obtaining information that will help him become more intimately acquainted with the variety of special-purpose trucks, parts and equipment in the field.

**¶** Read the issue from cover to cover and thereby obtain the maximum value from the Show.

# 1923 MOTOR TRUCK SHOW



## THE RUGGLES GENERAL DELIVERY

Ruggles Motor Truck Company, Saginaw, Michigan

The Ruggles Model 20 R with canopy top express body—is specially adapted for general delivery purposes.

Its 34-H.P. engine will carry a full 2,500-pound load without strain. The driver's compartment is exceptionally comfortable and roomy. Comfort for the driver may be further insured by a storm-proof All-Year cab.

Ruggles Trucks economically haul all loads up to 5,000 pounds. The moderate price, durability and low operating expense make these trucks economical units for any transportation need within their capacity range.

Model 20 R, capacity 500 to 2,500 pounds, chassis price \$1195. Model 40, capacity 2,000 to 5,000 pounds, chassis price \$1795. All prices f.o.b. factory.

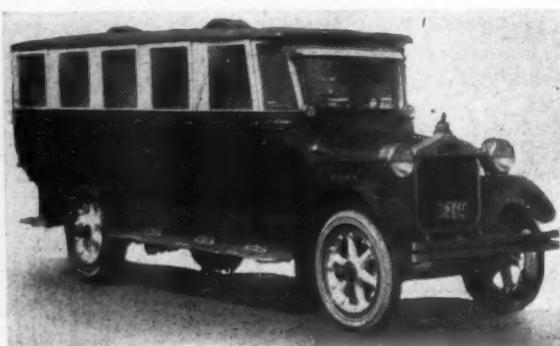
## THE TRAYLOR MOVING VAN

Traylor Engineering and Mfg. Co., Allentown, Pa.

The Traylor Truck is especially suited for the moving business because all Traylor Trucks are equipped with the Hiflex Spring Suspension which prevents vibration and crystallization of the vital parts and absorbs all road shocks. No vibration goes above the chassis, thereby affording the greatest comfort to the driver and insuring safe delivery of the load, by preventing jouncing and shifting of load.

All Traylor Trucks are equipped with solid tires. Complete resiliency is obtained through the action of Hiflex Spring Suspension.

The manufacturers state that many users claim a saving in tires of sixty per cent and in gas from two to twenty per cent due to this construction.



## SELDEN UNIT 31 DE LUXE MOTORBUS

Selden Truck Corporation, Rochester, N. Y.

Built particularly for interurban and long distance sight seeing service, the Selden De Luxe model makes a very attractive motorbus and one that will be dependable and economical. The Selden Unit 31, is equipped with a Brown body seating 19 passengers, including the driver.

The Selden Unit 31 was designed for two particular services—motorbus and fire fighting. While several types of bus bodies can be mounted on the chassis, the model as shown is best for interurban service or long distance tours.

The chassis is equipped with a special engine which with special gear ratio in the worm drive rear axle gives plenty of speed and yet all necessary power for hard pulls. The springs are designed for easy riding and combined with the Flexible Selden construction, a bus as easy riding as the best passenger automobile is secured.

## THE ONEIDA SUBGRADE SPECIAL

Oneida Motor Truck Company, Green Bay, Wis.

This company has recently changed its merchandising and manufacturing policies to the extent that it is specializing in the requirements of the individual purchaser or the specific requirements of certain trades.

The contractor's subgrade job consists of a 2½-ton chassis in which a 3½ ton rear axle is included. The reason given for using this sized axle is that a truck used for road and building operation work is usually overloaded and subjected to excessive road shocks. The rear wheels are 40 in. x 10 in., providing speed as well as more ready negotiation of bad roads. This job is fitted with a 5-speed transmission, permitting four speeds ahead. This truck is a practical five bag-two batch mix job with the flexibility and low operating costs of a 2½ ton unit.



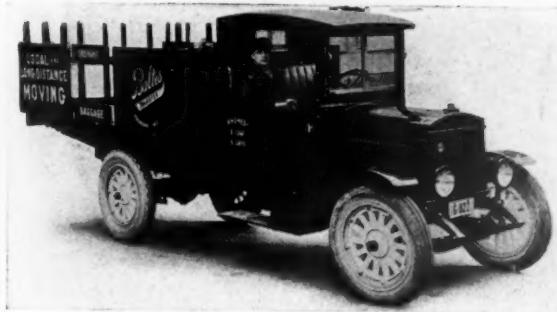
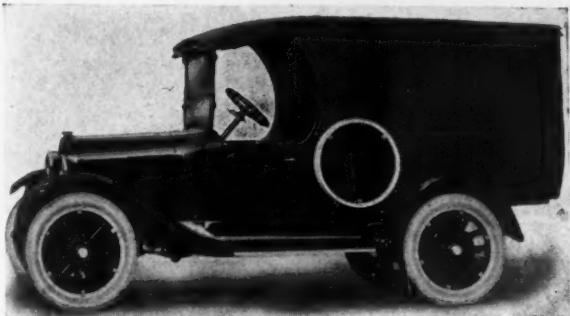
# 1923 MOTOR TRUCK SHOW

## DODGE BROTHERS COMMERCIAL CARS

Dodge Brothers, Detroit, Mich.

Merchants and manufacturers in more than two hundred lines of business have found Dodge Brothers' Commercial Cars to be useful and profitable in extending the radius of delivery work in the most economical and practical way.

The farmer, too, has found that the Commercial Car is unusually adaptable to his needs. It can always be relied upon to haul its full capacity at the same low cost of operation, month after month. Dodge Brothers also manufacture a Screen Side Commercial body mounted on the chassis illustrated.

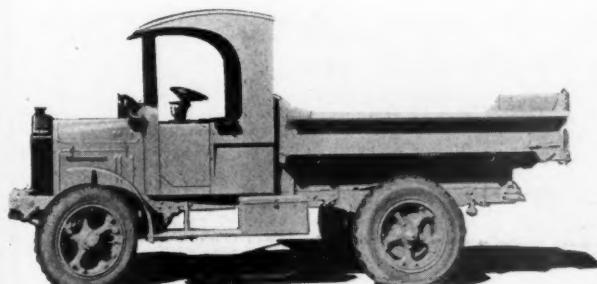


## THE OLYMPIC TRUCK

Olympic Motor Truck Co., Tacoma, Wash.

Showing one of the Olympic models equipped with a specially built body for the ice cream trade. The body was built in the Olympic plant. It is characteristic of the body work done by this company. All bodies, no matter what the type, are built to specification. This ice-cream job is specially featured by its water-tight construction, an essential requirement to prevent deterioration of chassis parts through the action of the salt.

The Olympic chassis is composed of well-known units. Among the units employed are the following: Buda engine, Brown-Lipe clutch and transmission, Spicer Universal, Timken front and rear axles and bearings, Timken-David-Brown worm drive truck and differential, and Ross steering gear.



## THE KISSEL TON EXPRESS

The Kissel Motor Car Co., Hartford, Wis.

Kissel in designing the Ton Express kept two important factors in mind, ability to handle light loads economically, and ability to hold up when subjected to severe and heavy service. Adaptability of the springs to all road conditions is claimed to make for easy riding. The engine is specially designed and provides the truck with a speed of 30 m.p.h.

A worm-drive rear-axle of the latest design and of proven strength is used, while the front axle is of the regular sturdy I-beam drop-forged type. The braking system is declared to be specially effective at all times on all grades. Briefly, throughout the entire job, the engineering principles, the constructional details, combined with proper weight distribution and balance, provides that factor of safety considered paramount in this size of truck.



## PIERCE-ARROW CONTRACTORS' UTILITY DUMP TRUCK

Pierce-Arrow Motor Car Co., Buffalo, N. Y.

A new type of contractor's special dump truck, developed recently by the Pierce-Arrow Motor Car Company of Buffalo, N. Y., for road work. Its short wheelbase of 9 ft. and 10 in. permits it to turn around in narrow places, for it will make a complete circle in a radius of 26 ft. Its high speed of 20 m.p.h. means more frequent loads and a greater daily tonnage.

The body has a capacity of 2½ yd. The length from bumper to tail gate is 17 ft. 4 in.

Its low gear ratio of 9 2/3 to 1 gives it tremendous power for steep ramps or heavy going, while its 40 x 8-in. rear pneumatic tires have a powerful grip for maximum traction. The front tires are 36 x 6 in.

# 1923 MOTOR TRUCK SHOW



## THE GMC FOR CONTRACTORS

General Motors Truck Co., Pontiac, Mich.

The accompanying illustration shows a GMC heavy-duty truck with body especially adapted to hauling aggregates for concrete work. Note that the body is divided to contain a complete batch in each division. The outstanding feature of this truck for contracting work is the GMC two-range transmission which, when using the low range, permits of an exceptionally lower gear reduction for heavy hauling. It also gives greater speed in high range when operating over normal road conditions. This truck will take a capacity load over roads and grades wherever traction can be secured without speeding the engine. All GMC engines have the removable cylinder walls, removable valve lifter assembly, dual cooling system and pressure oiling system. Every wearing part can be replaced.

## THE RUGGED HEAVY-DUTY "WINTHER"

Winther Motors, Inc., Kenosha, Wis.

The roughest job known to motor truckdom is construction work and it is in this work that the Winther has earned its laurels.

Every unit of the Winther, from the radiator to the tail-light, is of the best. The frame is hot rolled channel steel—the strongest obtainable—the sort of stuff that does not "give" under any conditions. The springs are made leaf upon leaf of chrome vanadium steel to give a maximum of shock absorption with a minimum of wear. The rear axle is of the well-known Clark internal gear type. The gears are 3½ per cent nickel steel. The wheels are cast steel disk type. Every unit a symbol of strength and solidity, yet with resilience enough to give highest efficiency either in heavy construction or heavy hauling work.



## THE TRANSPORT MODEL 15

Transport Truck Co., Mt. Pleasant, Mich.

Sales records indicate that Transport Model 15, 2000 lb. maximum, has proved particularly popular in the wholesale and retail field, due undoubtedly to its short turning radius and general flexibility which enable operation in close quarters and to that combination of strength and light weight which make for economical operation and upkeep, thus reducing the item of overhead, which every wholesale and retail merchant watches so closely.

Recognition, too, is taken of the fact that the truck is constructed throughout of specialized units, every one of which is nationally serviced, thus eliminating the risk of serious tie-ups in the transportation schedule when parts must be replaced.

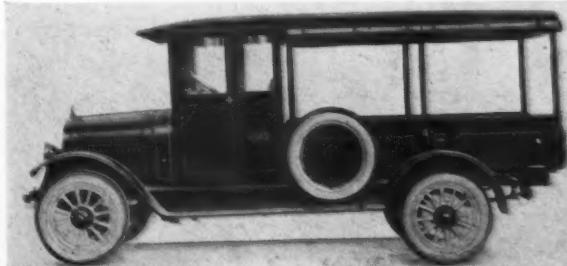
In other forms of light, fast delivery this model has also scored heavily. Body equipment for every conceivable type of service is supplied.

## GOODWIN HEAVY-DUTY MODEL

Goodwin Car & Mfg. Co., Inc., New York City

This company will specialize in the production and marketing of the new Goodwin 7½ to 10-ton truck, which is specially designed for heavy-duty work. In connection with their predecessor, the Goodwin Car Co., they have been engaged in the production of mechanical devices for economical freight transportation upwards of 20 years.

The personnel of this organization consists of men who know the needs of the heavy-duty operator. Among them are: Wm. H. Taylor, the president, a well-known figure in the financial world; Walter C. Guilder, the consulting engineer, who has had continuous contact with heavy-duty truck building for years; and Arthur C. Brady, the director of sales, who was formerly affiliated with the Mack Motor Car Co. in various capacities.



# 1923 MOTOR TRUCK SHOW

## NASH MODEL 3018 2 TO 2½ TON CHASSIS

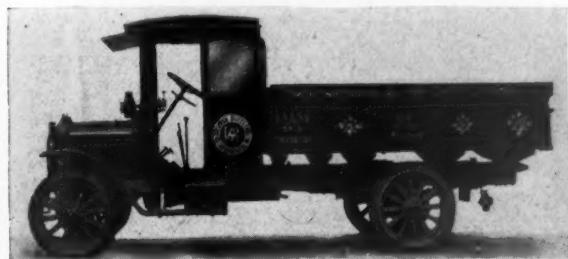
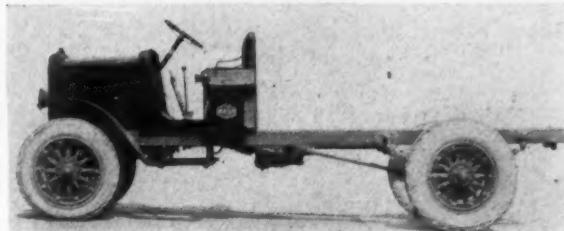
The Nash Motors Co., Kenosha, Wis.

Incorporating only those mechanical principles which have proven their worth in the hardest kind of service, Nash engineers sought service, reliability, and low operating costs in designing the model 3018 truck.

It will handle any 2 or 2½-ton load either of bulk or concentrated weight. It is of a size to maneuver advantageously through congested city traffic.

Electric starting and lighting system is standard equipment and the price of the chassis with solid tires is \$2150; with pneumatic tires \$2400, f.o.b. factory. The standard wheelbase of this model is 144 in. and an extended wheelbase of 168 in. can be furnished at \$50 additional.

Any type of body can be supplied on this chassis, including dump body with hydraulic hoist.



## THE LARRABEE SPEED SIX

Larrabee-Deyo Motor Truck Co., Binghamton, N. Y.

The Larrabee Speed Six presents a revolutionary type of commercial car having a carrying capacity of 1¼ tons. It is regularly supplied by the factory with bodies to suit the haulage requirements of any customer.

The six-cylinder power plant assures perfect flexibility with absolute absence of detrimental vibration delivering full 55 hp. with a surprisingly low fuel consumption. The perfect balance of the chassis, its economy and exceptional riding qualities, make this unit adaptable for the transporting of loads of any description up to its rated capacity. Its graceful lines and unequalled appearance becomes an advertising medium of considerable importance to the user.

## STANDARD MODEL 1-K BOTTLERS' TRUCK

Standard Motor Truck Co., Detroit, Mich.

During the past three years the entry of this company in the light-duty quality field has enabled their dealers to supply the need for a high-grade product, where maintenance and operation costs are considered equally as important as the first cost. Their Model 1-K chassis is ideally fitted for light loads where quick delivery on solid tires is desirable.

In addition to the Model 1-K, the Standard Model 75 speed chassis, gives the dealers an exceptional value in specialized construction. The same quality ideals are followed out in this model. The units are the same make as are embodied in the heavier models.



## MacDONALD MODEL O LOW-BED DRAY

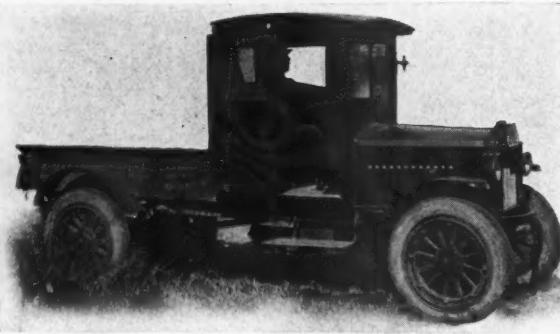
Union Construction Co., San Francisco, Cal.

This vehicle combines the speed quality of the delivery wagon with the facility of loading and unloading offered by the low-bed construction. Its record in general draying and transfer work has shown practical features of interest to owners to be remarkably quick time between loading at receiving points and unloading at delivery points. Its ease of steering and manipulation with the MacDONALD Hydraulic Steering system appeals to the driver.

The load platform is 18 in. from the ground. This platform can be made any distance above this dimension of 18 in. above ground, to suit purchaser's choice and without extra expense. There are no shafts, gears, nor mechanism of any sort underneath the body. The platform has greater area than any truck in the market of corresponding wheelbase. The loading can be easily done by hand truck direct on truck from either rear or side.



# 1923 MOTOR TRUCK SHOW



## THE AVERY MOTOR TRUCK

Avery Company, Peoria, Ill.

The Avery Truck is especially adaptable to both country and city hauling. It is of the popular 1 1/4 ton size and is constructed of only the highest class units; powerful 6-cylinder Avery engine; dry multiple disk type clutch; Tornbensen internal gear drive rear axle; three-speed selective gear transmission; chrome vanadium steel spring and Ross steering gear.

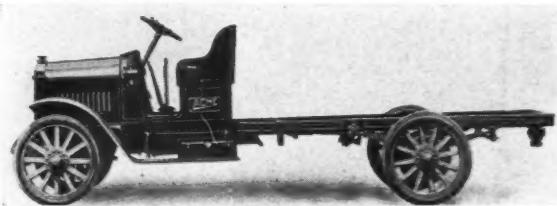
The regular equipment at no additional expense includes pneumatic cord tires all around, Alemite lubricating system, electric lights and starter, Willard truck-type storage battery, Klaxon horn, double bulb head lamps, tail lamp with license bracket, and an extra demountable rim.

## THE ACME MODEL 60-L, CAPACITY 6000 LB.

Acme Motor Truck Co., Cadillac, Mich.

This model was designed and built to meet the combined requirements of power and speed for city fire departments, passenger buses, moving vans, long-distance hauling, oil field use, road building and similar work. Model 60-L is very similar to Acme Model 60, except larger engine, greater loading space, longer wheelbase, greater chassis length, stronger rear axle and springs, larger drive shaft and various other units are larger and stronger than in Model 60.

It has a Continental Red Seal Model L-4 engine. This model has a direct speed of 28 m.p.h. while engine is running at 1600 r.p.m. The L-4 motor is regularly used on Acme Model 90 (capacity 9000 lb.).

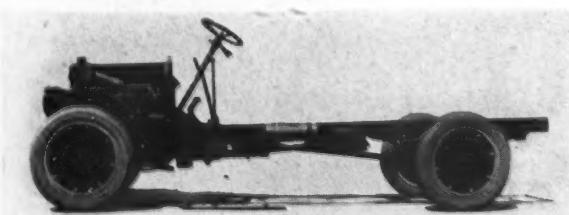


## THE HAWKEYE ONE-TON SPEED TRUCK

Hawkeye Truck Company, Sioux City, Iowa

The New Hawkeye Model O, 1-ton speed truck recently announced, rounds out the Hawkeye Truck Company's, Sioux City, Iowa, line to four models. It now includes, together with the 1-ton, a 1 1/2-ton, 2-ton and a 3 1/2-ton.

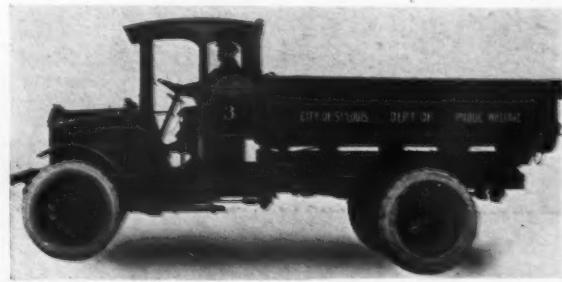
The New Model O, 1-ton speed truck, has been brought out to meet the demand for an over-size 1-ton speed truck. Most of the units used in this model carry a 1 1/2-ton rating, but combined with the high-speed engine, this truck will attain the speed usually expected of a 3/4-ton model. The engine speed at 30 miles an hour is considerably under the manufacturer's recommendations. The 5-in. channel frame, 38 in. front and 52 in. rear springs, transmission, clutch, steering-gear, front and bevel gear rear axle are units oversized and combined with the heavy-duty high-speed engine equipped with full force feed oiling system provide an unusual combination of strength and speed.



## LUEDINGHAUS 2 1/2 TON TRUCK

Luedinghaus Espenschied Wagon Co., St. Louis, Mo.

The illustration shows one of the fleet of dump trucks used by the city of St. Louis. The capacity of the body is 2 1/2 yards, without the wood flares. The underbody hoist permits the body to be placed directly behind the cab, which makes a compact installation, while the large pneumatic tires aid the truck in making quick deliveries of heavy loads. This type of truck is well suited for hauling coal, rock, sand, cement, gravel, etc. The cab is built in the Luedinghaus factories, and is known as an all-weather cab, since it can be entirely closed in bad weather.



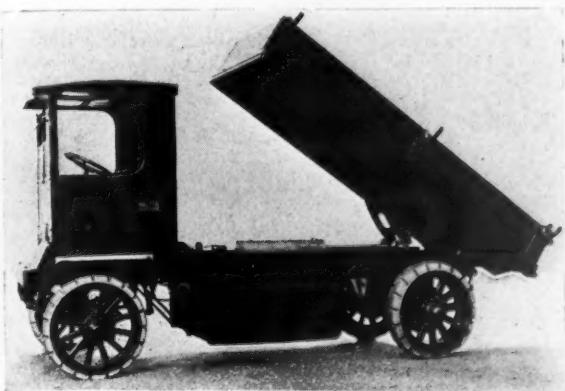
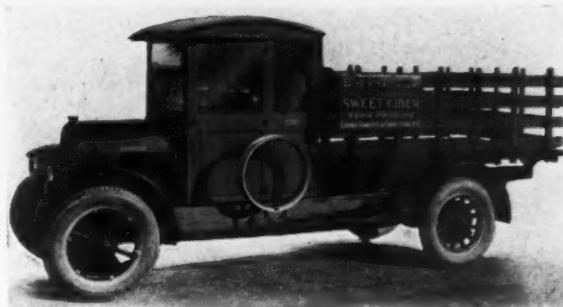
# 1923 MOTOR TRUCK SHOW

## BROCKWAY E2 1 TON HIGHWAY EXPRESS

Brockway Motor Truck Co., Cortland, New York

Although Brockway trucks are made for every line of industry, and in every style, the job illustrated and lettered E. J. Potter, Manufacturer and Dealer Sweet Cider, is interesting from the point of application in one of the innumerable minor businesses. It shows adaptability to most any service.

The Brockway Highway Express is constructed of high-grade material throughout and provided with a wide factor of safety. The initial cost may be slightly higher, but the ultimate cost is pointed out to be considerable less through the reduction of repair expense. This model is furnished with all styles of bodies, for every requirement.



## PACKARD GOOD ROADS TRUCK

Packard Motor Car Co., Detroit, Mich.

Showing the Packard Special EX good roads truck fitted with a high angle dump body having a partition in the center so arranged that the rear half of the load may be dumped without disturbing the front half which also can be dumped by the simple shifting of a small hand lever.

Road building is generally possible only a few months in the year and the truck is so important a unit in a road building operation that the Good Roads Special was developed especially for such work.

The rear tires are 42 x 9, this size giving unusual insurance to the contractor against loss of time in the rush of a road building job because of tire failure. Extra heavy-duty springs are provided with a special frame of chrome nickel steel. Wheelbase is 114 in.

## WALTER ELECTRIC TRUCKS

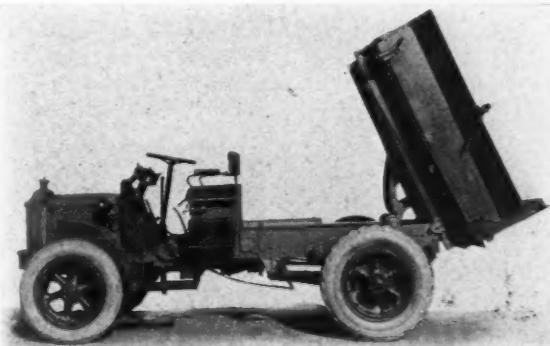
Walter Motor Truck Co., New York City

Walter Electrics have proven very satisfactory in dump truck service because of the combination of extra large electric motor and the Walter suspended drive and locking differential.

The greater reserve power of the motor, together with the "100% traction" enables these trucks to pull through very bad places without stalling. The short wheelbase permits easy handling in congested quarters.

Electric Dump Trucks have shown a very low cost for hauling ashes, refuse, coal and other materials.

The hydraulic hoist is operated by means of an electric motor mounted behind the cab controlled from the driver's seat. All essential parts of Walter Electrics are made interchangeable with Walter gas truck models of the same capacities.



## THE HIGRADE FOR HIGH-SPEED DELIVERY SERVICE

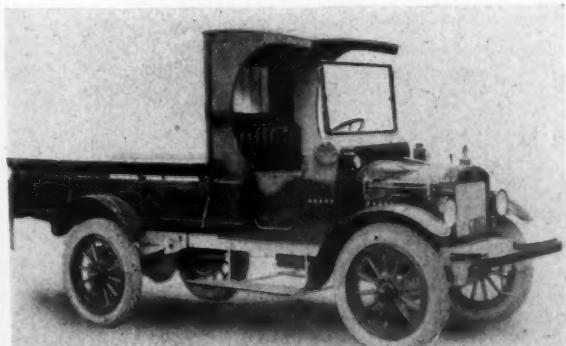
Higrade Motors Company, Harbor Springs, Mich.

This model high-speed delivery truck was designed for long-distance motorized delivery service. It is capable of hauling a one and one-half ton trailer.

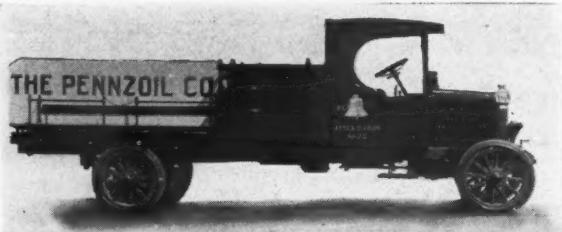
Owing to its correct balance and unique suspension it is exceedingly economical on tires, gasoline and oil, covering better mileage than the average passenger car.

All of the units assembled in the "Higrade" are manufactured by firms who specialize in their line, have had years of experience, employ expert workmen, have highly equipped laboratories, and specially built machine tools for the manufacture of their product.

Motor trucks, like any other piece of machinery, should be built for the specific service in which it is to be employed, and in this respect the specialized "Higrade" excels in long-distance high-speed delivery service.



# 1923 MOTOR TRUCK SHOW



## GARFORD MOTOR COACH MODEL 51-D

**Garford Motor Truck Co., Lima, Ohio**

In designing this special chassis and body many features have been incorporated which brings this model right up to the minute in bus development.

The low loading height of 25½ in. facilitates passenger movement and makes for shorter stops and faster schedules. Passengers when entering or leaving need take only one step to enter or alight from the coach. The low height also lowers the center of gravity, reducing sway and skidding dangers. Through the assembly of the steering gear on the outside of the frame more room is provided at the entrance, enabling quick entrance and exit. Rapid, but smooth deceleration for the taking-on and discharge of passengers is taken care of in the developments of brake construction. These are featured in the transmission-propeller-shaft service brake which has a drum 10 in. in diam. with 4 in. face.

## THE ATTERBURY TANK WAGON

**Atterbury Motor Car Company, Buffalo, N. Y.**

Showing the new model 2½-3-ton long wheelbase Atterbury truck in the role of tanker.

This Atterbury, with its 14-foot loading space, has a wide range of adaptability in a great many lines of business, such as logging, lumber, steel, pipe, plumbers' supplies, barrels, boxes, and furniture moving.

In the installation pictured it answers a three-fold purpose in the distribution end of the oil industry. First, it carries a 600-gallon two-compartment tank for bulk gasoline; second, a body is provided with capacity for six steel drums carrying diversified products, such as cylinder oils, 600-W and grease; and third, there is a deck along both sides of the tank for loading small cans, boxes and supplies.



## SCHACHT TEN-SPEED CONTRACTOR'S SPECIAL

**The G. A. Schacht Motor Truck Co., Cincinnati, O.**

The 4-ton model illustrated was built to meet a demand for a dump truck of large carrying capacity, yet light enough in weight to be within the law in those states where the maximum weight of truck and load is limited to as low as ten tons. In Ohio, where the legal limit is ten tons, this 4-ton job is exceptionally popular.

The Schacht Ten-Speed truck is adapted to every requirement of dump truck hauling. With its wide range of gear reductions, it combines power and speed to meet in the most effective manner any condition that may be encountered. In low gear it has abundant power, while a speed of twenty miles per hour in high when operating on the level is easily attained without exceeding the normal rate of engine speed, which is one thousand revolutions per minute.



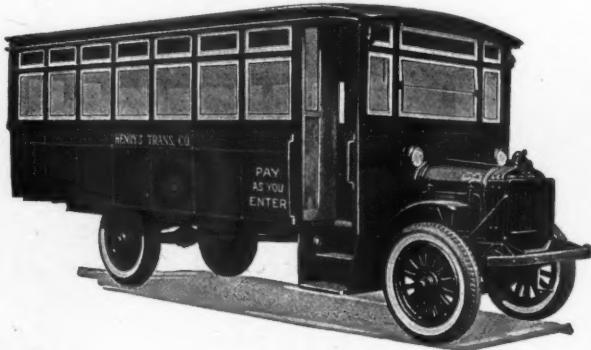
## THE U. S. 26-PASSENGER MOTOR BUS

**The United States Motor Truck Company, Inc.  
Cincinnati, Ohio**

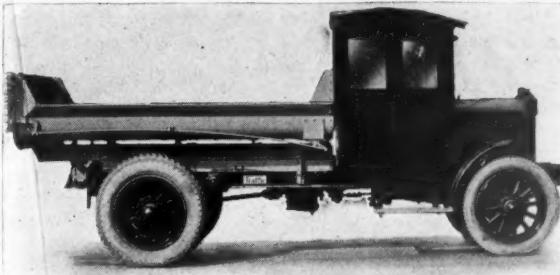
This twenty-six passenger bus is one of the complete line of U. S. buses built in a variety of passenger carrying capacities, with either cross or lengthwise seats. A line of Char-a-banc buses are also offered.

U. S. trucks are built in seven sizes, 1¼ to 7 tons, with U. S. bodies for every type of hauling. This complete line is the result of 14 years' truck building experience.

With unexcelled facilities for the building of bus bodies U. S. can build them according to any specification, but specialize on the prevalent and most approved types that are fitted to 1¼, 1½, 2 and 3 ton chassis.



# 1923 MOTOR TRUCK SHOW



## TRAFFIC 6000 LB. DUAL TRANSMISSION MODEL

Traffic Motor Truck Corporation, St. Louis, U. S. A.

Designed especially for contracting, coal, gravel hauling, heavy drayage and any other business where enormous reserve power in emergencies is necessary for the most efficient performance.

Having ten speeds forward, the lowest gear ratio being 171 to 1, it has a range of power especially adapted to the requirements of heavy-duty hauling. High speed up to 30 miles an hour. Unusual economy is assured through the practical use of a small economical engine, while the dual transmission has reduced operating costs of this truck to the minimum.

## THE NEW VIM IN LAUNDRY SERVICE

Vim Motor Truck Company, Philadelphia, Pa.

The new Vim truck illustrated is one of a fleet operated by the Holland Laundry, Inc., Philadelphia.

The body is of the standard panel type mounted on the Model 50  $\frac{1}{2}$ - $\frac{3}{4}$ -ton chassis, which is now the sole production of the Vim Motor Truck Company.

This type body is built especially for lines of trade, such as laundries, bakeries, florists, jewelers, department stores, etc., that require protection of their goods not only from the weather, but from loss or theft.

At the same time it provides a very effective and attractive advertising medium, as the large panels lend themselves admirably to any well planned and well executed style of lettering or design.



## THE STEWART MODEL 7X FOR CONTRACTORS

Stewart Motor Corp., Buffalo, N. Y.

This chassis for roadbuilders and contractors has a wheelbase of 120 in. with a remarkably short turning radius, either pneumatic or solid-tire equipment.

The body of 2 yd. capacity is comparatively low to the ground with approximately 40 per cent of the total load carried on the front wheels. The standard rear discharge type is fitted with an underbody hydraulic hoist and center swinging partition controlled by the driver. The body is 78 in. long and 67 in. wide, including the flares. The control lever on dial is attached to heel board underneath driver's seat. The pump is supported on special bracket bolted to both sides. It is impossible for hoist to crawl on chassis, there being a tie rod anchor to the body hinge.

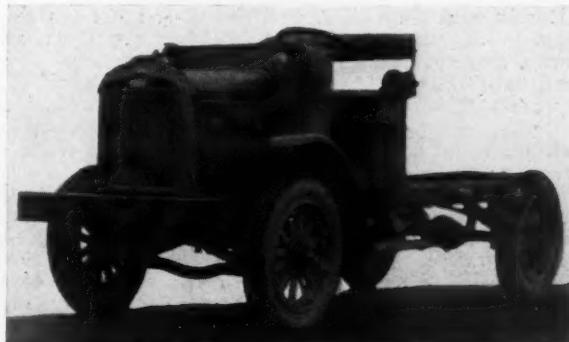
## MOLINE MODEL 10 FARM TRUCK

Moline Plow Co., Truck Works, East Moline, Ill.

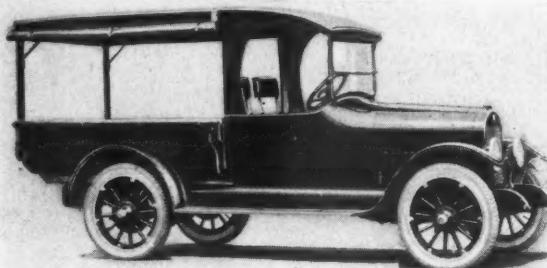
The Moline Model 10 truck is built for farm purposes with power take-off attachment extra. Moline Model 10 is comparatively a new product. The makers claim exceptional road ability for this model and that the rating of 1 $\frac{1}{2}$  ton means exactly this rating under any conditions.

Especial attention is called to the low gear ratio. There is not another truck of this same rating offered, and wide transmission gear faces used.

This company realizes that while speed is a big essential in rural hauling, there must be plenty of reserve power and ability on roads that are anything but ideal. Hence, Model 10 is essentially a pneumatic tired truck. It is neither too frail nor too massive, and is claimed to insure continuous performance over long periods at low first cost and minimum upkeep.



# 1923 MOTOR TRUCK SHOW



## WHITE TWO-TON TRUCK WITH 168-IN. WHEELBASE

The White Co., Cleveland, Ohio

The White 2-ton truck is a general utility truck, of medium capacity, especially adapted for use of concerns in need of a truck for general hauling purposes. Its long wheelbase permits the carrying of long-length materials, this feature appealing strongly to the lumber dealer.

Bodies are available in a wide variety of types, suitable for all hauling requirements. There are bodies with towers for telephone, light and power companies, tank bodies for oil companies, power dumping bodies for the hauling of loose materials such as coal, sand and gravel, bus and coach bodies for passenger service and numerous designs of stake, platform, enclosed and express bodies.



## DORRIS OFFERS THREE MODELS

Dorris Motor Car Co., St. Louis, Mo.

Dorris trucks, the K-2, K-4 and K-7, are the result of years of engineering knowledge. They are described as sturdy, dependable and economical in operation. Among the engineering principles embodied in the Dorris of today are the long stroke engine of the valve-in-head type, multiple-disk dry-plate clutch, pressed-steel frame, and other features, which are today proved essentials in truck construction.

Minor improvements have been added from time to time, such as a 5-bearing crankshaft, and the Dorris Distillator, a device which is claimed to completely vaporize the present-day low grade of gasoline.

The engine is featured because of its simplicity of construction and accessibility. The accessibility feature means a great saving of time and expense for the owner whenever it is necessary to service his truck.

## THE NEW DORT DELIVERY CAR

Dort Motor Car Co., Flint, Mich.

The Dort half-ton delivery car is designed especially for the use of business houses whose requirements call for swift expressage at low cost. This model is offered in the following forms: Chassis with forebody; with driver's cab; with driver's cab and express body; and with driver's cab, express body and canopy top. The latter form is shown in the illustration.

The specifications include Lycoming 4-cylinder,  $3\frac{1}{2} \times 5$  in. engine; American Bosch starting and lighting system; three-quarter floating Flint rear axle; extra-heavy pressed steel frame narrowed at the front to permit short turning radius; wheelbase,  $105\frac{1}{2}$  in.



## THE FAGEOL 2 1/2 TON 7-SPEED MODEL

Fageol Motors Co., Oakland, Cal.

This truck is capable of a road speed of nearly 30 miles per hour under full load and is able to operate under extremely adverse conditions, owing to the Fageol 7-speed transmission which gives 36 per cent increased road speed and 91 per cent greater low gear pulling power than possible with a 3-speed transmission. This transmission, claimed to be the first and for several years the only 7-speed transmission, is the special feature of the Fageol line of trucks including the following sizes:  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ -4 and 4-6 ton. It is widely used in the fruit industry in the West, where a saving of time on long hauls is of extreme importance to the producer. The larger sizes also find a ready market in mountainous country in the handling of ore and lumber, where the compound low gear makes it possible to operate with heavy loads over very adverse, steep and soft roads.



# 1923 MOTOR TRUCK SHOW



## THE NEW CLYDESDALE MODEL 10

The Clydesdale Motor Truck Co., Clyde, Ohio

The Model 10 Clydesdale illustrated is the latest product of this company, and is known as Model 10 with bevel drive rear axle, and as Model 10-A with worm drive. This chassis will carry a nine-foot body back of the cab; has electric lights and starter, and 34 x 5 cord tires all around.

The illustration shows style "E," express body with full canopy top and enclosed cab, complete at \$1791 and \$1841.

The driver is well protected in inclement weather as is also the load, the body being fitted with a full set of curtains. A feature of the body styles supplied with this chassis is the interchangeability of all body parts, making it possible for the owner to use two or more different styles of bodies in connection with the same chassis.

## NEW BETHLEHEM MODELS

Bethlehem Motors Corp. of New York, Allentown, Pa.

The new Bethlehem "Heavy Duty," Model "HN," 3-ton capacity truck, is the largest of the three models being furnished by the new Bethlehem Motors Corporation of New York, with plants at Allentown and Pottstown, Pennsylvania.

The other models of the New Bethlehem are the "Airline," Model "KN," 1-ton capacity, and the "Fast Freight," Model "GN," 2-ton capacity—both similar in design and appearance to the largest model, differing only in size.

The "Heavy Duty" model is offered to fill a popular need for a sturdily constructed truck of this capacity, and is furnished with a wide range of body styles, built in the Bethlehem plant, with 3-*yd.* dump bodies of standard make, operating with various types of power hoists, for road and construction work.



## MODEL 102 INTERNATIONAL TRACTOR TRUCK

International Harvester Co., Chicago, Ill.

Designed to meet the demand for two different classes of hauling work. As shown in the illustration, it is equipped with steel dump body and horizontal hydraulic hoist. This makes a very efficient unit for road construction work, street repair work, and street cleaning service. The illustration shows the Model 102 owned by the Bureau of Public Works, City of Chicago.

The tractor truck also can be used where a number of different semi-trailer bodies are transported by the same tractor chassis. It can also be used with a body on its chassis and for hauling one or more 4-wheel trailers.

A large number of units and parts of the Model 102 are identical and interchangeable with the same parts of the regular 10,000 lb. Model 101 International Motor Truck.



## NEW GRAMM-PIONEER MODEL 20, 2 TO 2 1/2 TON WORM DRIVE

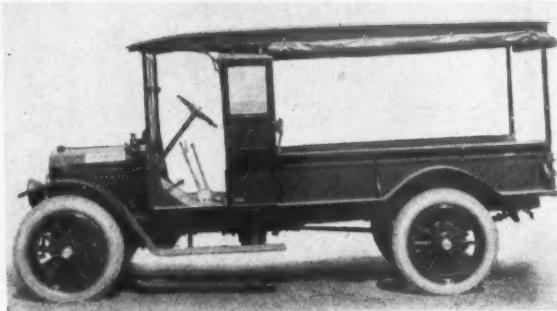
The Gramm-Bernstein Motor Truck Co., Lima, Ohio

In the third series of this very popular model have been preserved all of the high-class and individual engineering and mechanical features which have heretofore characterized its two predecessors.

The assembly includes Continental K-4 engine with full force feed oiling through drilled crankshaft to all bearings by gear driven pump; high tension magneto with impulse starter (as an option); 6 x 2 1/2 x 1/4 in. pressed steel frame with front bumper integral; double sets of internal expanding service brakes operating on rear brake drums; while the emergency brake is of 13 x 5 in. contracting, ventilated shoe type, operating on front propeller shaft, thus greatly increasing braking efficiency. Various details have also been refined. Full vestibuled cabs may be had at buyer's option.



# 1923 MOTOR TRUCK SHOW



## 1923 ONE-TON REVERE MODEL

Patriot Manufacturing Co., Havelock, Neb.

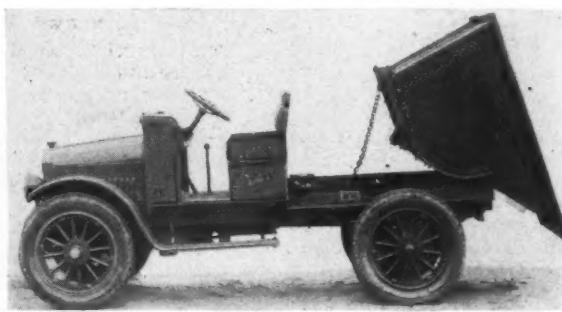
The 600 Series 1-ton Revere Model Patriot truck is built especially for speedy, heavy-duty delivery. It is rated at 25 m.p.h. and has a 128-in. wheelbase, a 22 ft. turning radius and a standard gear ratio of 6.2 to 1. The chassis price f.o.b. factory, equipped with 35 x 5 cords, is \$1295.

The engine is a 3 1/4 x 5 Continental Red Seal. Lubrication is by splash pressure system and cooling is by thermo-siphon. Fuel is fed to a Stromberg carburetor from a 20-gal. tank through a Stewart vacuum tank. Ignition and lighting are by high tension Splitdorf magneto and Presto head lights, or, by Bijur electric starting and lighting with Atwater Kent Ignition. Final drive is through a semi-floating worm drive rear axle.

## WATSON GRAVITY DUMP TRUCK

Watson Products Corp., Canastota, N. Y.

The illustration shows the Watson Gravity Dump job, designed especially for contractor service. All frame members are heat treated so as to insure longer life under the severe usage exacted from it in road contractor work. It will accommodate with equal facility both wet and dry batches. It dumps by pulling a trip lever. The driver can dump a load and return the body to its normal upright position without leaving his seat. The chassis is a model 40 one-ton Watson and the units comprising it are well known in the industry, including such parts as Buda engine, Browne-Lipe clutch and transmission, Timken axles, Dyneto generator and starter, Zenith carburetor, Parish frame, etc. It has a wheelbase of 105 in.



## WARD ELECTRIC MILK DELIVERY TRUCK

Ward Motor Vehicle, Mount Vernon, N. Y.

Here is the Ward Electric that is giving "Dobbin" a good race in the retail delivery of milk. Purchasers of these trucks say, "We wouldn't go back to horses as a gift." Authentic comparative cost records show a saving of 20 per cent to 35 per cent in operating and maintenance costs over horse-and-wagon delivery.

Besides actual saving in costs, the Ward Electric milk delivery model carries more cases of milk, and the insulated body keeps the milk cool in summer and prevents freezing in winter. The body is constructed of three-ply panels on the outside, one-ply panel on the inside, and dead air or cork insulation between. No ice need be used except on extremely hot days—and then only a very little. In winter to prevent freezing, electric lamps are used to keep the milk at the proper temperature.

## SIGNAL ROAD BUILDER

Signal Truck Corp., Detroit, Mich.

The latest addition to the Signal line is the "Road Builder." It is a completely specialized 7200-lb. unit, designed and built especially for the use of road contractors and others in like industries. A complete job is furnished by the manufacturer, including a 2-yd. steel dump body with underbody hoist. For the protection and convenience of the driver, an All-Weather cab with sliding drop curtains is installed. 38 x 7 front and 40 x 8 rear cord pneumatic tires are standard equipment. An oversize motor, 4 1/2 x 5 1/2, developing 40 hp., together with a special radiator with exceptionally large cooling area is being used, so that abundant power is always available and so that the unusually hard work that such a truck is called upon to do will not in any way affect its efficiency. An aperture in the transmission case allows for the use of a power tire pump.



# 1923 MOTOR TRUCK SHOW

## ATLAS MODEL 22 MERCHANTS' DISPATCH

Atlas Truck Corp.

Division of Industrial Motors Corp., York, Pa.

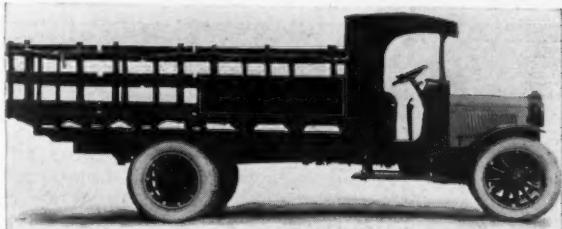
The Atlas Model 22 is the one-ton, high-speed type and lists at \$1495 f.o.b. York, Pa. It is equipped with the Buda 3 3/4 x 5 1/8-in. engine, Atlas transmission, Atlas worm drive rear axle, has a 130-in. wheelbase, and 34 x 4 1/2 pneumatic cord tires, front and rear. Electric starting and lighting is furnished as regular equipment. The company explains that inasmuch as the design and construction of this unit is suitable for use in practically every line of business, bodies are furnished for every business service. The body shown in the illustration is of the panel type, which is very popular with the confectioners.



## THE DUPLEX LIMITED

Duplex Truck Co., Lansing, Mich.

The Duplex Limited is a medium capacity vehicle, capable of high speed when needed and of sufficient adaptability to make it suitable for any kind of truck duty in its capacity class. The illustration is that of this 2-ton job. It has a wheelbase of 145 in. and a loading space of 121 in., measured from the back of the driver's seat to end of frame. The engine is a 4-cylinder, L-head type with a bore and stroke of 4 in. x 5 1/4 in., respectively. The gear set provides three speeds forward and one reverse. High speed is direct. The rear axle is of the worm gear type with one piece malleable steel housing. The worm and worm gear and differential are assembled as a unit on the carrier which is very easily removed for inspection or adjustment. Gear ratio, 6.5 to 1.



## MODEL S FIVE-TON DIAMOND T

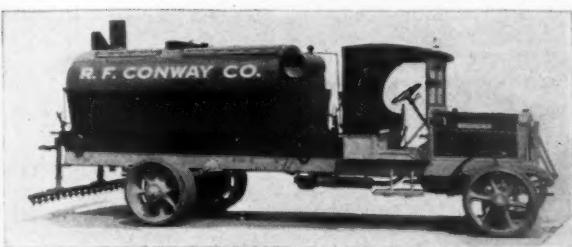
Diamond T Motor Car Co., Chicago, Ill.

This outfit carries the asphalt spreading equipment for the R. F. Conway Co., of Chicago.

The tank is of 1000 gal. capacity with a built-in kerosene heating system. A 16 gal. tank provides fuel for four kerosene burners fed by hand pumped air pressure, operating similarly to the ordinary blow torch. There is no difficulty in maintaining an even temperature.

An in-built power take-off in the truck transmission furnishes power for the main pump mounted back of the cab. This pump feeds asphalt to the jets in the rear. The pressure created is dependent, of course, upon the running speed of the transmission. Any excess asphalt is diverted back to the tank through a by-pass line and cock.

With the exception of the special power take-off arrangement this outfit is a standard 5-ton job.



## THE UNITED HIGHWAY SPECIAL

United Motors Products Co., Grand Rapids, Mich.

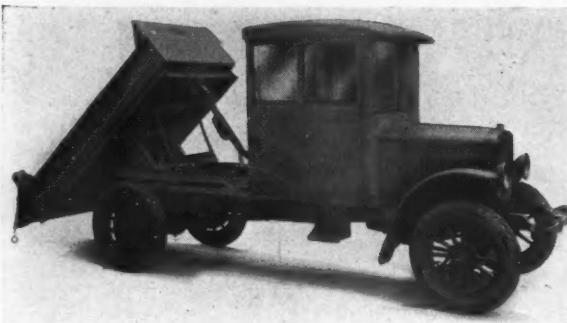
The Highway Special, a new product of the United Motors Products Co., Grand Rapids, Mich., is of 500-2000 lb. capacity and sells for \$895. The price includes electric starting and lighting and pneumatic cord tires.

This light model is assembled from well-known units and supplied at extra cost with panel, canopy, stake and express bodies, made especially for this vehicle.

The engine is a special Herschell-Spillman, having a bore of 3 1/2 and a stroke of 5. The electrical equipment is Bosch. The cooling system includes a baked enamel, heavy pressed steel shell radiator with removable core and tanks. A Zenith jet type carburetor is used with gravity feed from a 15-gal. tank. The clutch and three-speed gearset are of Fuller design, both being in unit with the power plant. The rear axle is a Columbia spiral bevel type. Drive is taken by a single Spicer propeller shaft. The steering gear is of the Lavine worm and nut type.



# 1923 MOTOR TRUCK SHOW



## SERVICE MODEL 25

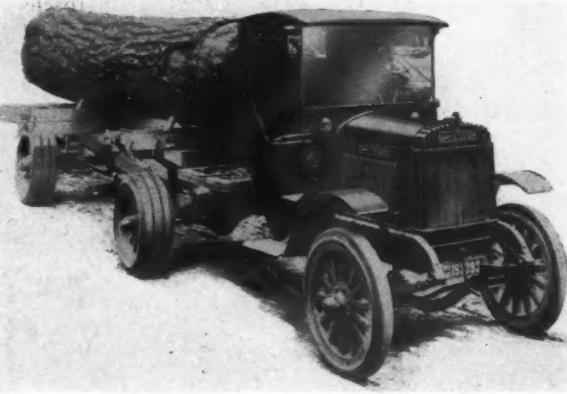
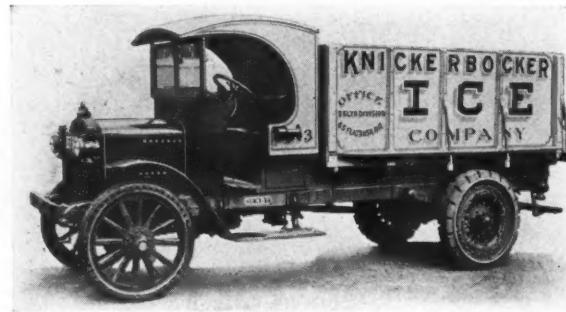
Service Motor Truck Co., Wabash, Ind.

This Service Model 25 is a heavy-duty type of speed truck, of 2500 lb. capacity, and with a maximum speed of 40 m.p.h. It is equipped with an automatic end dump body making it a very desirable outfit for use among city coal dealers for the delivery of small orders to the retail trade. The chassis is equipped with a Buda high-speed, heavy-duty truck engine,  $3\frac{3}{4} \times 5\frac{1}{8}$  in., developing 31.5 hp. at 1400 r.p.m. Propeller shafts are of the three joint type, with metal universal joints in the center and flexible fabric joints at front and rear, center being supported by heavy ball bearing. Rear axle is fixed hub type, with ingenious straddle mountings of drive pinion and spiral bevel gear. Standard equipment includes 34 x 5 in. cord pneumatic tires, electric lights and starter and transmission driven speedometer.

## THE DENBY KNICKERBOCKER SPECIAL

Denby Motor Truck Co., Detroit, Mich.

This special model is the result of three years' performance in the ice business. It is equipped with a standard Denby propeller shaft brake, found on all Denby models, which insures positive but smooth braking under all load conditions and minimizes skidding. The two-piece propeller shaft with three universal joints and husky center bearing insures a true running propeller shaft. The engine and transmission are set as a unit, four speeds forward and one reverse gives a wide range of power coupled with three optional gear ratio in the rear axle, thus insuring equally satisfactory operation in any territory. Cushion wheels and special springs practically eliminate broken ice. The body is designed specially for the ice business with drainboards and carries 20 cakes of ice weighing 300 lb.



## LOGGING WITH A DAY-ELDER IN A WASHINGTON FOREST

Day-Elder Motors Corp., Newark, N. J.

There is no class of work for motor trucks more exacting in its demands than that of logging and lumbering. It is essential that there be rugged strength in the chassis, an abundance of power in the engine, and an absence of service requirements, that the truck may perform its service day in and day out without interruption. The popularity of Day-Elder trucks for this work in these districts is presented by the above company as the best evidence, signifying the presence of these qualities.

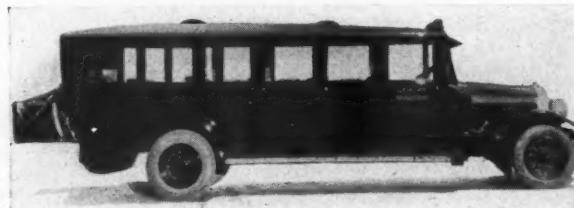
The Day-Elder line of worm-driven motor trucks is complete from the one-ton speed wagon on pneumatic tires to the 5-6-ton heavy-duty—six different sizes—eleven different wheelbases—a truck for every need of motor truck transportation.

## MACCAR DE LUXE BUS

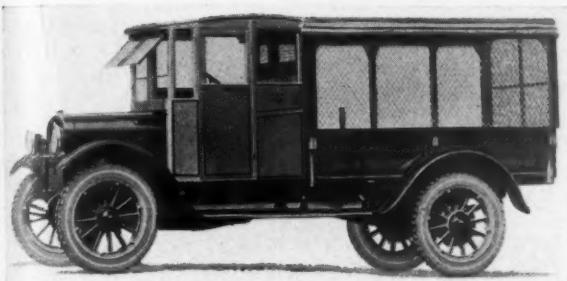
Maccar Truck Co., Scranton, Pa.

The accompanying view is that of one of the Maccar De Luxe buses operated by the Cleveland-Youngstown Bus Co. between these two cities. These buses average 296 miles per day and provide a seating capacity for 21 passengers.

The De Luxe body manufactured by the Bender Body Co., Cleveland, Ohio, is mounted on a standard Maccar bus chassis, which is featured by two distinctive mechanical characteristics especially desirable in a bus chassis. They are the Maccar demountable power plant and the Mueller Dual Spring Suspension.



# 1923 MOTOR TRUCK SHOW



## THE REO SPEED WAGON

The Reo Motor Car Company, Lansing, Michigan

The Reo Speed Wagon, the pioneer of vehicles of this type, can now be had with twelve standard bodies, thus suiting nearly every kind of commercial haulage requirement. The illustration shows the Closed Cab, Screen Sides, Canopy Top Express model, listing at \$1485. Most styles can be supplied with either open or closed cab, while some are equipped with the full canopy without cab. Through simple attachments, the express body can be converted into a grain box, stock rack, carry-all or double decker, and just as easily reconverted. Thus, four bodies are available for the price of one, plus the small cost of attachments. The chassis can also be furnished with sills and cab so that the owner can have special bodies mounted thereon. The loading space of the body is 44 x 96 $\frac{1}{2}$  in.

## ONE-TON MASON ROAD KING

Durant Motors, Inc., Mason Motor Truck Division  
New York City

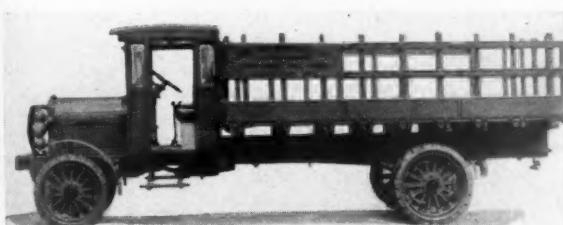
This truck is constructed to provide economical operation, low cost of maintenance and also to haul heavy loads at slow speeds as well as fast speed for light delivery service. Accessibility and simplicity were main considerations in the designing of this job. The mechanical features in the design are claimed to be such that minimum time is required when making adjustments, or in removing and replacing a unit. The ample size of the frame, bearings, springs, etc., are designed to make for added safety. The 4-cylinder engine is an L-head type, cast in block having a bore and stroke of 4 x 5 in. Complete details of this model are given elsewhere in this issue.



## BUFFALO TRACTOR TRUCK

The Buffalo Truck and Tractor Corp., Buffalo  
Clarence, N. Y.

The Buffalo tractor truck possesses an unusual feature in the gentle application of power through its Dual Transmission Low Gear Reduction. This double transmission arrangement allows ten speeds forward and four reverse, speeds ranging from one mile in seven hours to 25 m.p.h. It is therefore possible to obtain any speed or power required with a normally operating engine. A power shaft extending throughout the frame, another feature, is of great utility as it will permit the user to employ the truck's power for cutting feed, cutting and raising silage, run a cement mixer, hoist weights, etc. A reserve cooling system permits the working of the power shaft or operating it at an extreme slow speed without overheating.

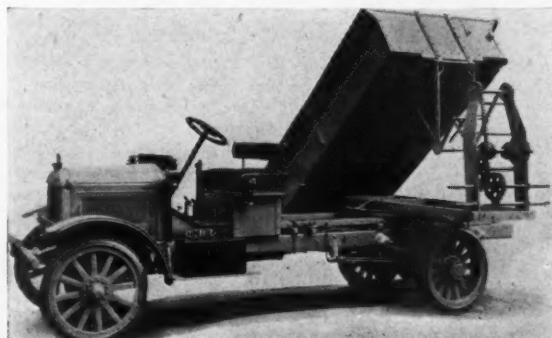


## ARMLEDER MODEL H-W

O. Armleder Co., Cincinnati, Ohio

Showing a job especially designed for the road contractor. The feature is the means provided for dumping sand or stone from either side or the rear of the vehicle.

The chassis is a Model HW, 2 $\frac{1}{2}$  to 3 $\frac{1}{2}$  tons capacity. The dump body is of steel and the hoist is manually operated.



# 1923 MOTOR TRUCK SHOW



## SIX MODELS IN GARY LINE

The Gary line, manufactured by the Gary Motor Corp., Gary, Ind., includes six models, namely: 1, 1½, 2, 2½, 3½, 5, and a motor bus chassis. All are equipped with Buda engines and Timken worm-drive rear axles. The other units of the line vary slightly as the capacities increase and in accordance to special requirements, but as a whole they are very similar throughout. They comprise parts made by well-known and reputable makers.

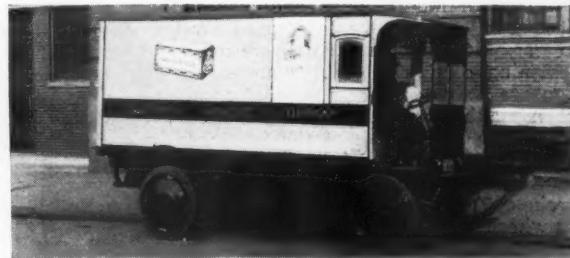
Briefly, the 1-1½ Model F chassis is powered by a 4-cylinder, L-head type, 3-point suspended, 3¾ x 5 in. Buda. Oiling is by force and splash system and cooling by thermo-syphon. Ignition is provided by an Eisemann magneto and carburetion by a Master. Clutch and transmission are Fuller make, and both axles Timken. Steering is provided by a Ross gear. The wheelbase is 130 in. and loading space to end of frame 98 in. Standard equipment includes driver's seat with lazy back, side and tail oil lamps, Buell whistle, oil can, jack, tool box and tool kit.

## THE WALKER ELECTRIC LINE

Walker Vehicle Co., Chicago, Ill.

Walker Electric Trucks are built in five sizes of 1250 lb., 1-ton, 2-ton, 3½-ton, 5-ton capacities. Two distinguishing features of Walker trucks are the Balance Drive and the Disk Wheels. The drive unit consists of an electric motor enclosed in the torpedo shaped rear-axle, and the drive wheels enclosing the well-known Walker Balance Drive. The drive shafts transmitting the power from motor to wheels have no bearings to add friction, but are supported by the splined ends in the differential, while the pinions at their other ends float between the idler gears, thereby producing a perfectly balanced application of power at two points near the rim of each rear wheel.

A special Light Delivery Walker electric truck to carry a maximum capacity of 1000 lb. is also built. The illustration shows a 2-ton model used by the National Biscuit Co.



## SPECIAL COACH ANNOUNCED BY PAR-KAR

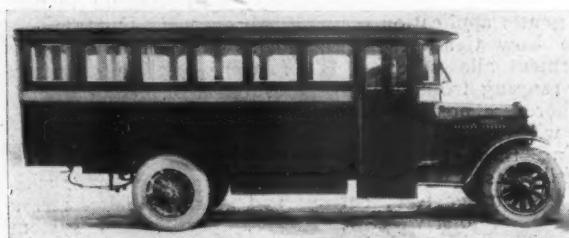
The Par-Kar Coach Co., St. Louis, Mich.,

is calling the trade's attention to its new coach especially designed and built for passenger transportation service. This coach is described as having motive power as free from vibration while traveling at 35 m.p.h. as at 10. The seats are so arranged as to permit easy aisle movement without disturbing fellow passengers, and are of design and construction to afford complete comfort. Briefly, the coach was built and furnished with one prime idea in view—the meeting of passenger demands, such as safety, comfort and speed. The mechanical construction and the type and assembly of the units are claimed to make for economy in operation and provide maximum life.

## THE AUTOCAR FOUR CYLINDER MODEL

The Autocar Co., Ardmore, Pa.

The 4-cylinder 2 to 3 ton Autocars have won a wide acceptance in all lines of business during the past year. The Type H of this model has a wheelbase of only 114 in. and the Type K has a wheelbase of 138 in. It will be seen that both of these types combine the short wheelbase advantage with ample power and carrying capacity. The rated overall capacity of the 2 to 3 ton 4-cylinder Autocar is 15,000 lb. and the unladen chassis weight is only 5500 lb. for the Type H and 5600 lb. for the Type K, leaving a wide margin for the weight of the body and paying load. Out of the total of more than 700 Autocars which were actively engaged in highway construction in 26 different states during the 1922 season, a large proportion were the Type H 4-cylinder 2 to 3 ton Autocar.



# 1923 MOTOR TRUCK SHOW

## BODIES AND CABS FOR FARM TRUCKS



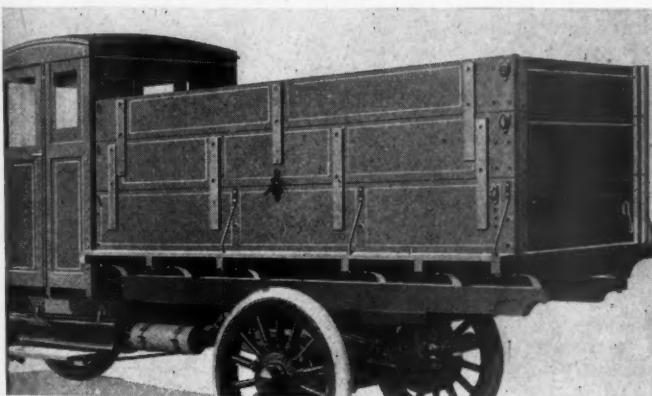
**Clark Special International Speed Truck Cab**

This all-season cab, offered by the J. L. Clark Mfg. Co., Oshkosh, Wis., and selling at \$87.50, is 51 in. wide at the rear with tapered clear-vision front. Distance from dash to back, 42 in.; inside width measurement, 46 in. The cushions are deep and of the twin type with spring back. The windows of each side drop and the 11 x 13 in. sliding window in the rear is set in a solid wood back. The roof is solid slatted and is covered with black oil duck. It can be shipped knocked-down or standing. The approximate weight is 500 lb.



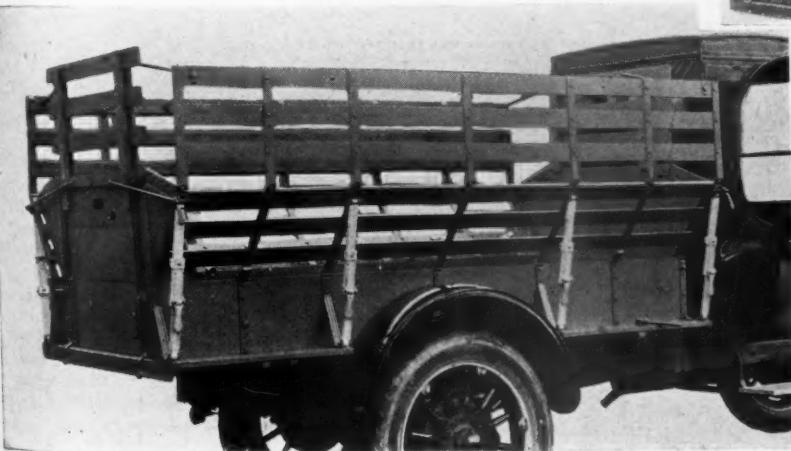
**Spaulding Coupe for Ford Trucks**

The Spaulding Mfg. Co., Grinnell, Iowa, is offering a new truck cab that not only possesses attractiveness, but comfort and accessibility as well. The doors are extra wide and the construction and assembly of the cab itself is such that one may remove units from the coil without dismounting the cab from the chassis. Briefly the features are: Two-piece windshield, windows which drop in the doors, bolted collapsible construction, no screws or nails, auto finish and dry kilned wood parts.



**Special Spaulding Farm Job With Cab**

The above illustration is that of the Spaulding No. 500 farm body with a No. 52 cab for assembling on a Ford one-ton truck chassis. It is built by the Spaulding Mfg. Co., Grinnell, Iowa, in three sizes. All the panels which are of kiln dried box board, have top box irons and grain strips, and are supported inside and out by panel braces, end gate rods and spread chains. The bottom is tongue and groove yellow pine, and the sill is of regular Spaulding construction.



**Three Views of the 8 in 1 American Convertible Motor Truck Body**

This body provides eight or more different uses. The builder, the American Wagon Co., Dixon, Ill., states that it will fit any chassis, and can be attached without any machine work. The utility of this body to the farmer who has need for a body that will serve him in all his requirements, can readily be appreciated by the following eight conversions. They are: Special grain-type body; flat rack with scoop board up from grain body; flat rack with scoop board down from grain body; hog-rack body with scoop board up; stock rack body; flared rack body; and basket rack. The above illustrations are of the flared rack body, flat rack flared body, and grain-tight body.

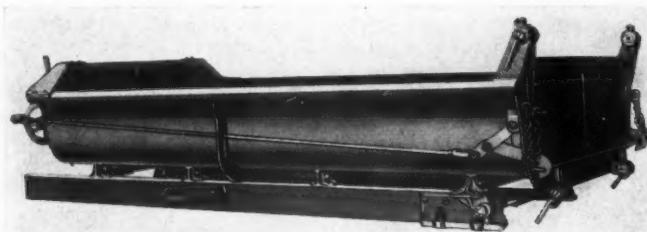
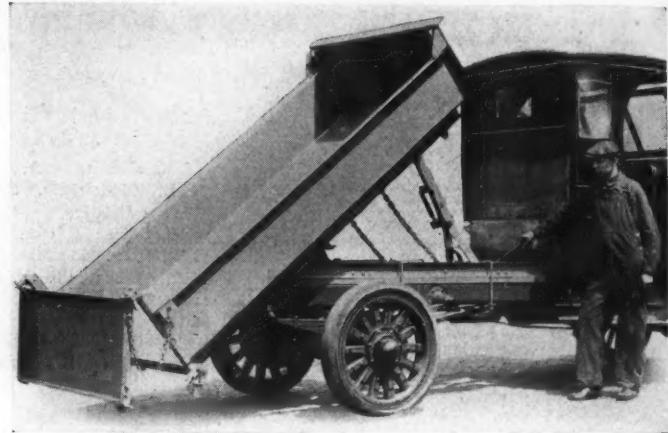


# 1923 MOTOR TRUCK SHOW

## Lee Automatic Dump Body

This body, built for all loads of from 1 to 6 cu. yd., by the Lee Trailer & Body Co., 2343 S. LaSalle St., Chicago, Ill., has no working parts and is not attached to the mechanism of the truck. It just rolls backward on a patented roller segment and an underslung track that is carried inside the tural steel shapes.

No fitting is necessary to attach this body on any make or size of standard truck chassis, as cross members are drilled for all frame widths. An important feature is the simplicity of operation. Pulling one handle does all the work. The automatic dumping of the body is simultaneous with the opening of the tail-gate. The return of the body to its original upright position is just as simple and automatic. Seven years of development work lies back of this product, and it embodies principles that practice has proven successful and which have been incorporated in other Lee products.



## K & J Bodies Have an Adjustable Underframe Construction

The Kilbourne & Jacobs Mfg. Co., Columbus, O., offers bodies in all sizes from  $1\frac{1}{2}$  yd. to 5-yd. water line level capacity. These bodies contain a very valuable feature in the adjustment underframe construction, which permits the fitting of it to a truck chassis with a width ranging from 32 to 40 in.

These jobs possess another feature in the economy in which they can be stocked, as it is not necessary to carry more than one body in any one particular size to serve any chassis width. All the bodies are furnished with complete underframes assembled and attached ready for setting on the truck and clamping fast. The restricted tail-gate device is most convenient for the operator as it is regulated from the front end of the body by means of a lever and quadrant ratchet. It controls an opening of from  $2\frac{1}{2}$  in. to 5 in. for the spreading of materials.



## Woonsocket Dump Equipment is of Sheet and Pressed Steel Design

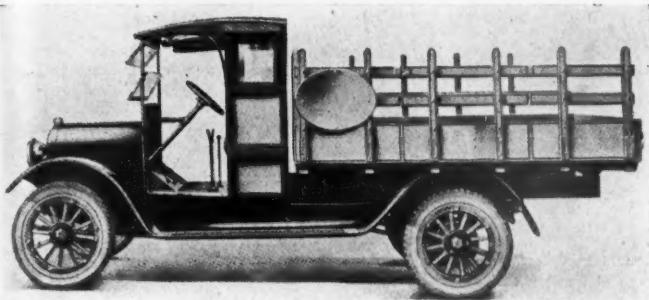
This particular job is described by the Woonsocket Mfg. Co., Woonsocket, R. I., as universally adapted to dump work of every description. The tail-gate is double acting and the hoist is manually operated. A full load can be loaded in as short a time as twenty seconds. A ratchet and brake arrangement permits the body to be held in any position, or lowered to any angle. Briefly, the hoist is rugged and sturdy in construction as well as light, and is a complete unit with the body.



## Abingdon's Farm Body

The body illustrated on the left, built by the Abingdon Wagon Co., Abingdon, Ill., is catalogued as No. 4141. It is equipped complete with a comfortable cab of oak construction, spring cushions, padded back, removable back with window, double swing crystal glass windshield, drop windows, and well braced doors on each side. Plenty of leg and head room is provided. The body is 36 in. deep, 52 in. long and 96 in. wide. Heavy grain cleats of angle steel are used. Other constructional features and equipment include positive hold-down rods, oak cross sills, tongued and grooved bottom, anti-spreader chains and heavy strungers. It is made of good grade box-board and the capacity is equal to farm body bed.

# 1923 MOTOR TRUCK SHOW

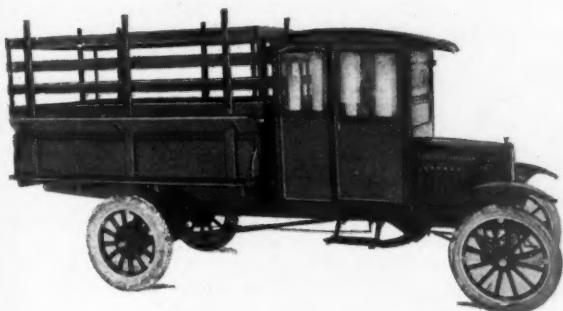


## Babcock's Light Truck Utility Body Well Adapted for Farm Service

This body, with its net loading space of 9 ft. x 5 ft. 6 in. is very popular for the standard  $\frac{3}{4}$ -ton chassis, like the Olds, Reo, White, etc. The removable sides which are built in two sections, are made up of 3 ft. stakes and 12 in. panels. It is known as No. 62-H and is shown herewith with a Type C cab and base.

## New Babcock Cab for Protection Against All Weather

This flexible, steel-wood vestibule cab was designed first of all, to provide the driver with comfort and protection against cold and storm. It is an all-the-year-around cab as it can be entirely opened up in summer. Drumming and rattle has been eliminated and its flexible construction is such as to absorb completely all vibration and weave, factors that ordinarily reduce the life of a cab. Included among some of this constructional features are the following: Tight joints; comfortable spring seat and back; soft cushions; and double, steel-faced, warp-proof hinged windows. These cabs, built in two sizes, are shipped knocked-down, in order to secure the lowest possible freight rates. Both these products are manufactured by the H. H. Babcock Co., Waterbury, N. Y.

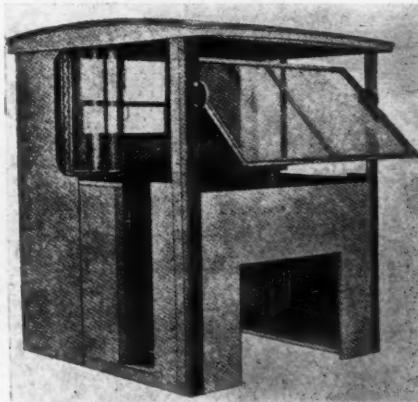


## Ford Ton Truck All-Purpose Stock Body

This job, with cab, was designed and built by the Auto Body Works, Inc., Appleton, Wis. The Model 35A heavy type express body is equipped with removable cattle-rack sides four feet high and drop tailgate. The entire construction of body and cab is of maple throughout, reinforced by heavy iron braces. A 4 $\frac{1}{2}$  ft. x 8 ft. loading space is provided and the panels are 14 in.; flareboards, 7 in. The glass of the cab is laid in felt and the windshield is of the full ventilating type. The seat with its reclining back, is fully upholstered. Ample and accessible tool boxes are provided. A body of this nature is used very extensively by the farmer for hauling grain, potatoes, milk, cattle, etc.

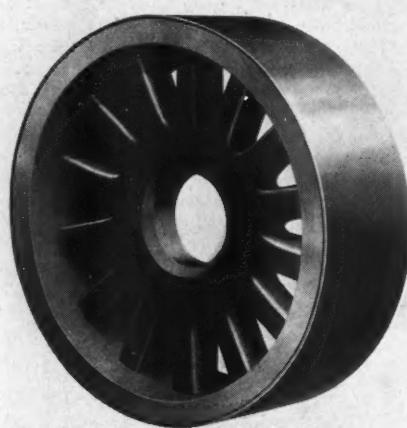
## The Field Universal Cab

The Field Universal Cab, made by the Field Body Corp., Owosso, Mich., is designed for mounting on all makes and sizes of truck chassis. It is of the new cutaway side type, which provides free access from either side, clear vision and easy signalling. Adjustments in mounting are easily made, because of the optional front and rear overall dimensions, height and width of floor boards, height and width of seat box, etc. Construction is of wood and heavy steel. The doors are of metal slide on ball bearings. Windows and windshield dash are of pressed steel, baked enamel. Cushion and lazy back are deep and comfortable, hair-padded over a specially designed spring structure. Rattle and noise is prevented by the placement of tension springs at all points of contact.



# 1923 MOTOR TRUCK SHOW

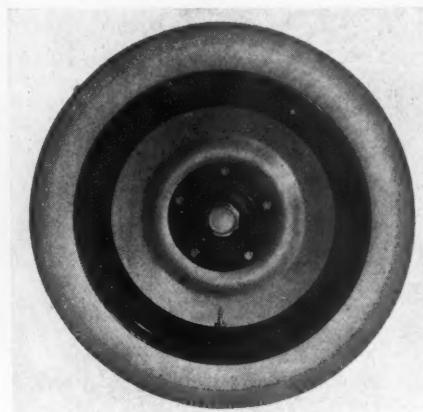
## MOTOR TRUCK WHEELS



**The Motor Wheel**

Only selected, second growth hickory kiln-dried by their own facilities is used in the manufactured wheels by the Motor Wheel Corp., Lansing, Mich. In assembling, special facilities, developed through more than twenty years of experience in wheel-building, enable the maintenance of standards of accuracy and strength at every point.

Especial care is exercised in priming and finishing, to safeguard the natural qualities of the wood-stock against deterioration. This concern controls every manufacturing operation, from standing timber to finished wheel.



**New Disteel Wheel for Light Trucks**

The new type Disteel wheel, having the standard straight valve stem outside is standard equipment on the Federal Fast Express and the new light Standard truck. This wheel, recently announced by the Detroit Pressed Steel Co., Detroit, Mich., is especially well adapted for light trucks. The entire wheel demounts quickly straight out from the hub, the wheel is strong and adds greatly to the appearance of the neat delivery truck. The Disteel wheel for trucks follows the same principle of construction as the Disteel wheel on passenger cars.



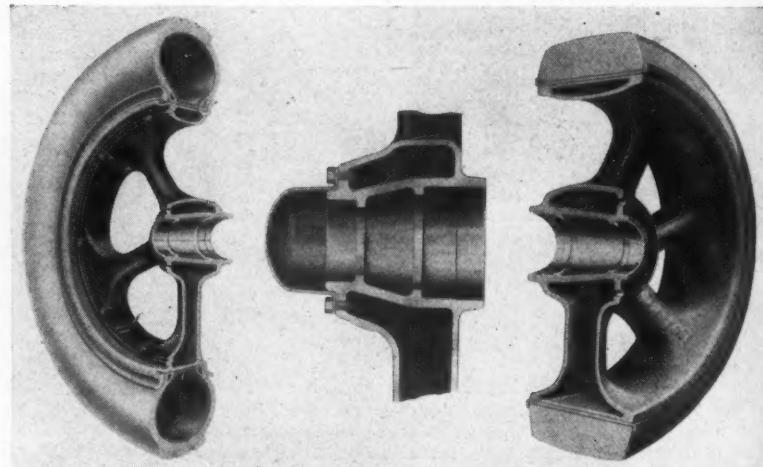
**The Stopshok Wheel**

This wheel is of a different type and construction than heretofore seen in the category of cushion or so-called resilient wheels. It is a wheel floatingly mounted on a resilient bearing, the rim and tire of wheel constituting the only unsprung weight of a vehicle on which these wheels are mounted. One helical spring encircling the hub on which the laterally slideable sleeve is mounted, backed up by the one spring, constitutes the sole resilient feature of this wheel. It is manufactured by the J. F. Davis & Sons Co., West DePere, Wis.



**"Standard" Truck Wheels**

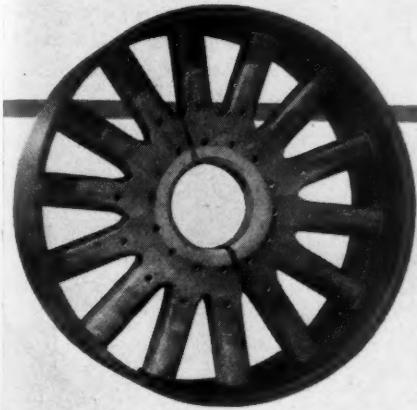
The Interstate Foundry Co., E. 61st St. & Roland Ave., Cleveland, O., is manufacturing the "Standard" cast steel truck wheel at its exclusive wheel plant, Clearing, Ill. The product is a cast steel truck wheel of hollow spoke design with hub cast integral which gives strength with minimum weight. All wheels are machined complete. Besides taking care of the individual motor truck builders' requirements, a full line of wheels for Timken and Sheldon axles are stocked for the needs of the assembler.



**Dayton Steel Truck Wheel**

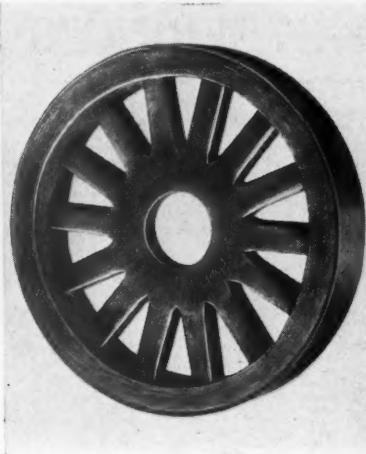
The ability of the Dayton Steel Wheel to withstand terrific side-thrusts was convincingly brought out by tests held by the Bureau of Standards, the results of which appeared in its Technologic Report No. 150, issued March 17, 1920. In one of these tests, that of wheel No. 13, the testing apparatus broke at 101,000 lb. pressure. These wheels which are stated to combine strength with light weight, pleasing appearance and resiliency are supplied as standard equipment on many of the leading trucks on the market today. They are said to be proven correct as to their principle of construction, following the best engineering practices and standards. Manufactured by the Dayton Steel Foundry Co., Dayton, O.

# 1923 MOTOR TRUCK SHOW



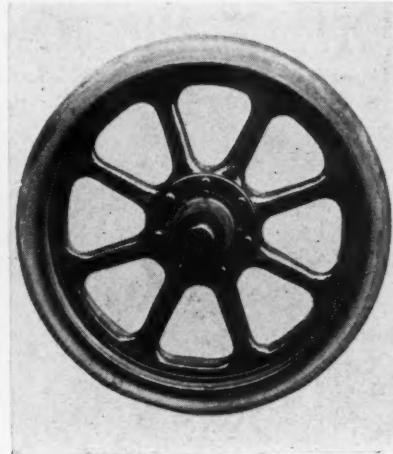
### Hoopes Metal Feloe Truck Wheel

The Hoopes Metal Feloe truck wheel, made by Hoopes Bro. & Darlington, Inc., West Chester, Pa., is a combination wood and metal wheel. A feature is the method of capping the spoke ends with a metal cap. The end of each spoke is white leaded and then forced into a metal cap under hydraulic pressure, this excluding all moisture at this point. The metal capped spokes in turn set in the metal feloe. This construction eliminates practically all trouble from shrinkage and looseness. The insertion of hickory wedges at the hub during assembly is a patented feature. The entire wheel is shrunk and wedged in a manner as to make the completed product almost an integral unit.



### The Northern Truck Wheel

The Northern Wheel Co., Alma, Mich., manufacturers of wood wheels for both passenger cars and trucks, confines the major portion of its output to wheels for lighter trucks. In addition to standard replacement wheels for all makes, a complete line of Ford wheels are made.



### Van Hollow Spoke Wheels

These hollow spoke sectional wheels are cast in four sections which are then tongued, grooved and riveted. This construction is claimed to make for light weight, clean, sound castings free from strains and a good appearance. All Van wheels for pneumatic tires take standard wood wheel hub equipment and standard demountable rims. Wheels for solids are built to standard S. A. E. dimensions. The Van Wheel Corp., Oneida, N. Y., manufactures a complete line of truck wheels from the 30 x 3½ Ford type for pneumatics to the giant 40 x 12 solid tire type.



### Bethlehem Rolled Steel Truck Wheels

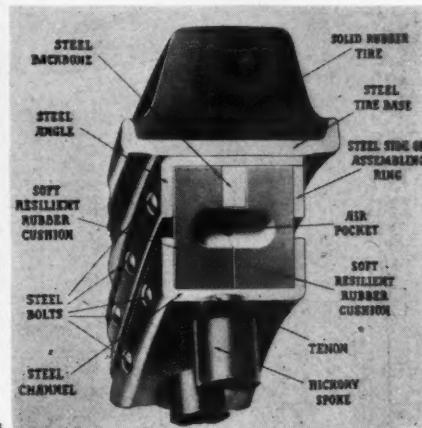
This wheel is made from a rolled steel I-beam by a simple, yet unique method. A specially rolled I-beam is punched out so that the web becomes the spokes and the flange becomes the feloe of the wheel. The spokes are ground and staggard, and the I-beam is then formed to circular shape. The two ends of the beam are electrically welded, making a one-piece, integral structural. Built by Bethlehem Steel Co.



### The Schwarz Wheel

The Schwarz Wheel with interlocked spokes combined with steel feloe is one of the latest developments in wheels manufactured by the Schwarz Wheel Co., Frankford, Pa.

It will be noted from the illustration that the spoke tenons fit in a cup-shape depression in the steel feloe. The steel feloe is applied to the spoke assembly under a pressure of approximately 27 tons. This pressure extended over the periphery of the wheel, and the unusually tight arch formed at the hub by the interlocking spokes, insures an extraordinary amount of wheel strength and provides a construction that makes the wheel impervious to the effects of swelling and shrinking.



### Morand Cushion Wheel

One of the features of the Morand Cushion Wheel, built by the Morand Cushion Wheel Co., Chicago, Ill., is the interchangeability with pneumatic tires of all sizes from 34 x 4½ to 44 x 10. The cushion effect is actually produced by the wheel itself, thus not relying in any way upon any flexibility obtained from the solid tire. The Morand Ford wheel is an application of cushioning principles applied to a light wheel, and built especially for the front and rear of the Ford one-ton truck.

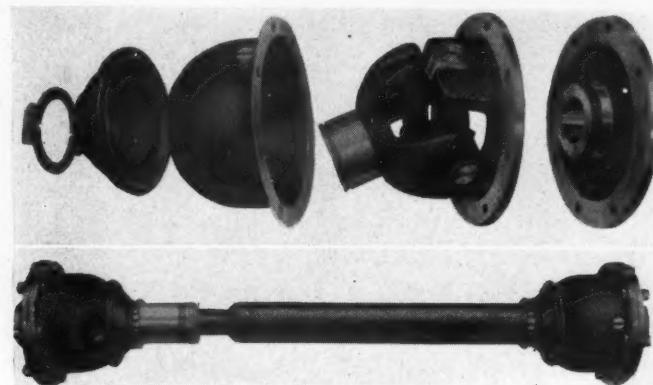
# 1923 MOTOR TRUCK SHOW

## TRANSMISSIONS—STEERING GEARS—UNIVERSALS



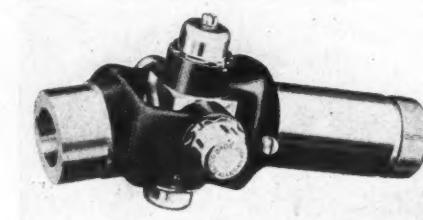
Thermoid-Hardy Universal Joint

The Thermoid-Hardy universal joint, made by the Thermoid Rubber Co., Trenton, N. J., is a coupling in which the ends of the shafts are permanently bolted to disks of flexible surfaces. Friction is said to be thus eliminated and lubrication not necessary. The fabric is claimed to be impervious to the action of either oil or water. The elastic disks also act as cushions in the driving shaft, absorbing all shock. The endurance of these joints have been thoroughly established by the severe tests.



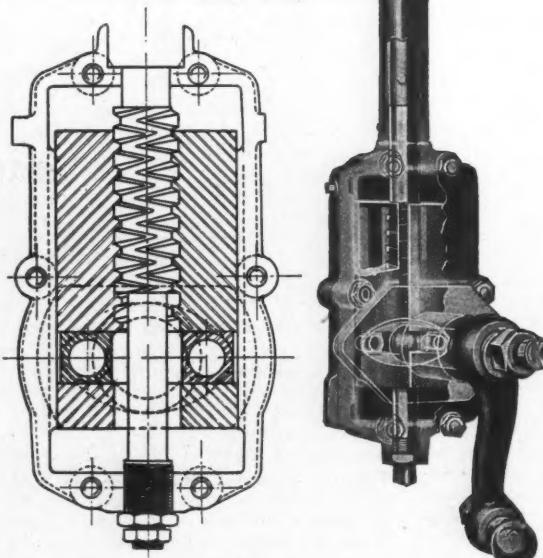
Spicer Universal Joints

All parts, including drop-forgings and sheet stampings, are made right in the factories of the Spicer Mfg. Corp., South Plainfield, N. J. The Spicer joint can be furnished either separately or as a set consisting of two universal joints and shaft. The entire unit is made of carefully heat treated steel. The forward joint includes a slip-joint which is to allow for any variation in the overall length of the set due to spring action. The slip-joint is provided with ten parallel splines, which permits free longitudinal action, relieving the axle and transmission bearings of undue axial strains. The shaft is of high-carbon, cold-drawn steel tubing. The entire set may be removed without disturbing any other parts.



Blood-Brothers Model B Oil-Lubricated Universal Joint

The entire model B joint, made by Blood-Brothers Machine Co., Allegan, Mich., is lubricated through a single opening with either oil or semi-fluid grease. As the lubricant is said to be used efficiently and as none is lost through leakage, one application is stated to be sufficient for from five to fifteen thousand miles running. All the working parts are fully protected against dust and grit, and the bushings are fully supported and securely locked in place. The construction is simple, making it an easy matter to disassemble and reassemble without the use of special tools. Four sizes of these model joints and propeller shaft assemblies are made as they cover the entire capacity range of automotive vehicles.



Lavine Steering Gear

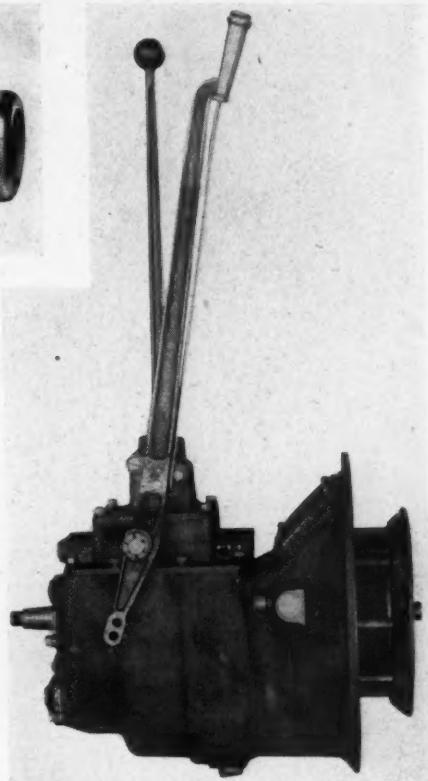
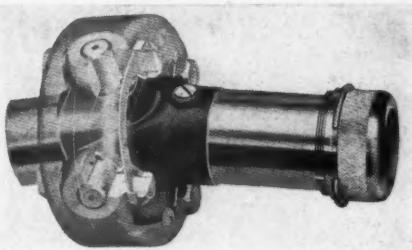
The Lavine steering gear, made by the Lavine Gear Co., Milwaukee, Wis., is of the split-nut type which gives the proper irreversibility necessary to eliminate road shocks. All internal parts are of quality steels conforming to analysis making for long wearing qualities. All these parts are hardened and ground to very close tolerances. The sliding heads or blocks working in opposite directions at the turn of the hand wheel forces at all times the lubricant into the threaded area keeping the bearing surfaces always well lubricated. These gears are produced in all sizes to accommodate every capacity truck.

# 1923 MOTOR TRUCK SHOW

## The Mechanics Oil Lubricated Universal Joint

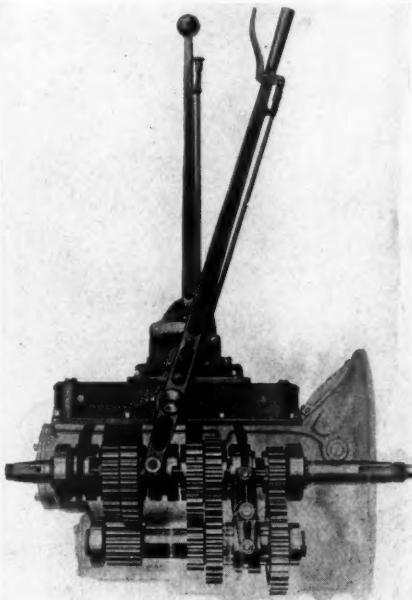
The Mechanics Universal Joint, manufactured by the Mechanics Machine Co., Rockford, Ill., is lubricated and the construction is such that it will retain oil over a long period of time.

The principal parts of this joint are the housing, which is made in two parts; two yokes with driving trunions; and four bushings. The housing, which also serves as the connecting driving member, is made of steel stampings. The edges of the housings are surface ground, making for an oil-tight joint. The manner in which the packing washers are retained and protected, contacting on all four sides with metal parts, makes it possible to compress the packings very firmly, thus preventing dirt and grit getting into the bearing points. Two oil plugs are provided in each joint.



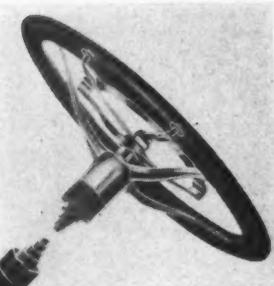
## Cotta Constant Mesh Transmission

Cotta transmissions, made by the Cotta Transmission Corp., Rockford, Ill., are of the constant mesh type. Speed changes are made through the engagement of jaw clutches. They are made in all sizes for both amidships and unit mounting in both three and four speeds for trucks, motor buses, tractors, etc. The standard truck reductions are as follows: 1st, 5.2 to 1; 2nd, 3.68 to 1; 3rd, 1.86 to 1; 4th, 1 to 1; and reverse 4.66 to 1.



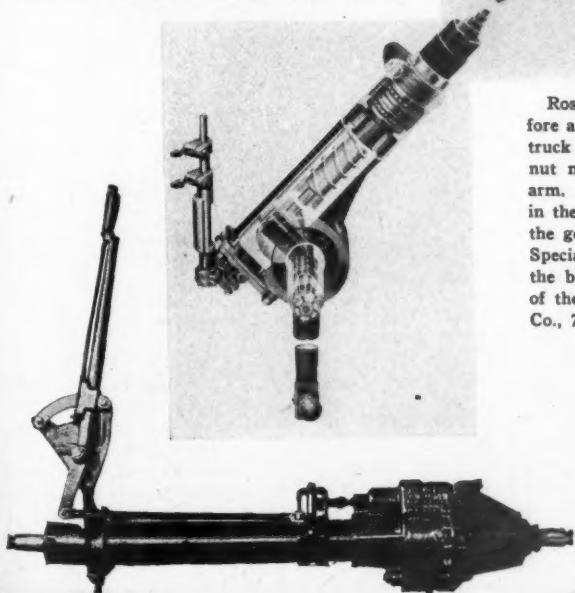
## Special Fuller Bus Transmission

Fuller & Sons Mfg. Co., Kalamazoo, Mich., is offering a special bus model for medium and light weight buses known as the model GU-9, shown above. For larger buses the model HU-1, which is slightly larger but built along the same lines, is offered. The light bus model provides 4 speeds forward and one reverse and is fitted with either a dry-plate, multiple-disk clutch, or an all-steel clutch running in oil. A great many changes have been made in this transmission to adapt it for bus service. Annular ball bearings thruout, and 3 1/2 per cent nickel steel gears and shafts.



## Ross Steering Gears

Ross Steering Gears are made in different sizes in two general designs, one for fore and aft steering, and the other for cross steering, in order to meet various motor truck requirements. The special feature of the Ross steering gears is the screw and nut mechanism, which transfers the rotation of the steering wheel to the steering arm. The up or down thrust of the screw is absorbed in very large ball bearings in the upper end of the main casing. These bearings reduce frictional losses within the gear, help to make it easy to operate, and give an absolute assurance of safety. Special means have been provided to insure perfect lubrication, because the size of the bearing surfaces makes thorough lubrication absolutely essential. A description of the new cam and lever steering gear just announced by the Ross Gear & Tool Co., 760 Heath St., Lafayette, Ind., appears elsewhere in this issue.



## The Ahlberg Dual Transmission

The K. E. Ahlberg Co., Los Angeles, Cal., points out that when its Dual Transmission is installed it compounds all the speeds of a truck and doubles the number of speeds obtained before installation. The gears consist of one spur and one internal, which when not in mesh, acts as coupling and provide a direct drive. A reduction of 62 1/2 per cent is claimed, permitting a higher gear ratio for level roads and a reduced cost per ton mile. The production now includes models for several standard makes of trucks. The construction of this unit is such that any mechanic can make installation in a short time.

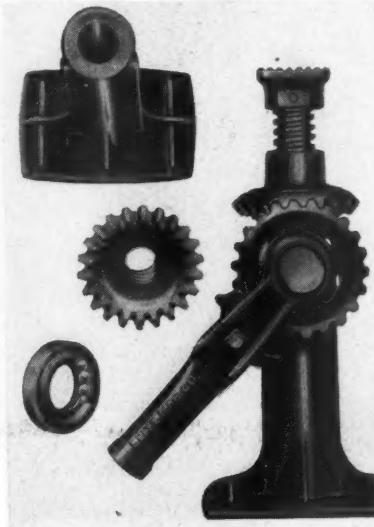
# 1923 MOTOR TRUCK SHOW

## COMMERCIAL CAR JACKS



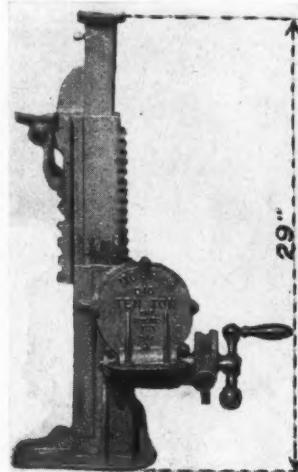
**The Brute Kimball Jack**

The new No. 5 model Kimball ball bearing jack for heavy trucks, known as the Brute, according to the manufacturers, F. W. Mann Co., Milford, Mass., embodies many new features of construction apart from the original Kimball truck jack. Tremendous power without bulk or great weight is stated to be the achievement in this jack. The case-hardened steel head has a milled top for gripping anywhere. Fifty pounds pressure exerted at the end of its 47-in. handle is said to be sufficient to lift a ten-ton load. The load is carried on heavy ball bearings and the column is lifted by a bronze nut in the main gear which, running against the steel column, is claimed to prevent sticking or freezing. It stands 12½ in. high, and rises, 6½ in.



**Reliable Jack, No. 28**

The Reliable Ball Bearing Jack No. 28, manufactured by the Elite Manufacturing Co., Ashland, O., is a husky jack built for heavy-duty truck service. It is stated to lift 10 tons with an equal ease as one ton. The strong side lift of this jack is so supported to carry any load without springing the rack or housing. Both the top and side lift are easily and quickly adjustable, giving a full length rack for high lifting. The range of lift is unusual, ranging from 13 in. to 29 in. All working parts are of steel, and the worm and pinion are made integral, which does away with all keys. This construction also gives the jack a shrouded pinion gear.



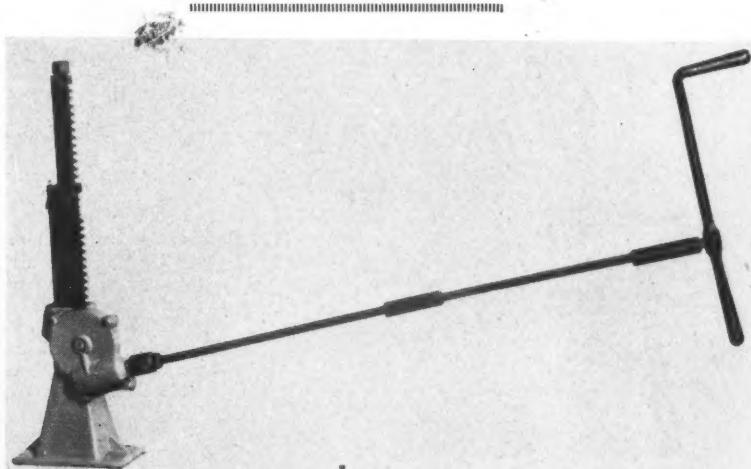
**Mosher Heavy-Duty Jack**

Very little physical effort is required to operate this ten-ton jack, manufactured by the Mosher Mfg. Co., 12 E. 57th St., Chicago, Ill. It is pointed out that this compact jack contains no springs or pawls, thereby reducing liability of breakage. The strong side lift of this jack is so supported to carry any load without springing the rack or housing. Both the top and side lift are easily and quickly adjustable, giving a full length rack for high lifting. The range of lift is unusual, ranging from 13 in. to 29 in. All working parts are of steel, and the worm and pinion are made integral, which does away with all keys. This construction also gives the jack a shrouded pinion gear.



**Walker Screw Jack, No. 266**

The Walker Screw Jack No. 266, one of the extensive line of jacks covering practically every need in the automotive field, manufactured by the Walker Mfg. Co., Racine, Wis., is designed to lift the heaviest of trucks. Strength is the predominating feature of this jack. As many trucks have different height axles, a double-height cap was incorporated on the head piece of this jack to meet this condition. The gear ratio and handle length enables one man to easily lift the six-ton capacity of the jack. This jack is 10 in. high; cap, 3 in.; rise, 6 in.; weight, 20 lb.; capacity, 6 ton; and screw diameter, 1½.



**Morrison Double-Range, Continuous Lift Jack**

The Woods Engineering Co., Alliance O., is manufacturing a new jack, which is entirely new in principle, construction, operation and compactness. It is made in four sizes, ranging in lifting capacity from 2 to 8 ton and is designed to fulfill the demands for all capacity motor vehicles. Its high lifting range extends from 11½ in. to 14 in. By reason of its long folding handle, operation is accomplished from a standing position. This jack is entirely constructed of malleable iron and steel.

# 1923 MOTOR TRUCK SHOW



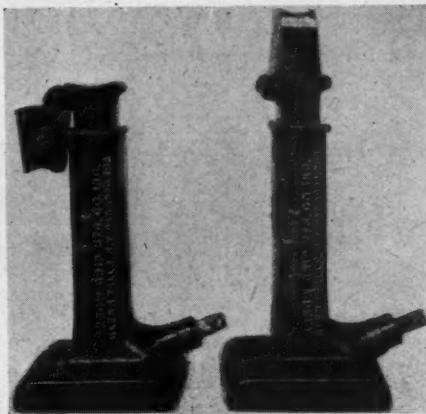
### Buckeye Adjustable Motor Truck Jacks

This special jack is a modification of other Buckeye models. This type of quick hand adjustment is original with the Buckeye Jack Mfg. Co., Alliance, O., and is applicable to models 7, 13, 14, 15 truck jacks. Jacks constructed in this manner are said to give the greatest possible range of lifts. This particular jack is of the single-acting type and is constructed of the same material and exactly like the Buckeye single-acting railroad jack. It is designed to meet the users every requirement.



### Special Barth Truck Jacks

The Oliver-Barth Jack Co., Milwaukee, builders of jacks for forty years, is supplying Barth jacks in two sizes for both manufacturers and fleet owners. This jack is strongly constructed of certified malleable castings and is stated to be reliable in service. The simplicity in mechanism is such that there is practically few parts to get out of order. It is quick and positive in action. A 3-ft. I-beam section steel handle is provided. Briefly the specifications are: Model No. 4 capacity, 3 tons; height, 14 in.; rise, 8 in.; weight, 21 lb. Model No. 19 capacity, 6 ton.; height 14 1/4 in.; rise, 7 1/2 in.; and weight, 29 lb.



### Arrow Grip Jacks

Model 302 is an Arrow Grip Jack particularly adapted to the needs of truck operators and garagemen. Four rollers in the base permit it to be placed in position or withdrawn quickly and easily. As it takes the weight, the rollers compress into the base, giving a broad substantial foundation. A step on the lifting column cares for low front axles. The accompanying illustration is that of Model 300 which is made for vehicles whose rear axle clearances are too great for the regular model. It is featured by a two-inch extension tip. These jacks are made by the Arrow Grip Mfg. Co., Inc., Glens Falls.



### Sunderman Hydraulic Truck Jack

This jack, made by the Sunderman Corp., Newburgh, N. Y., is described as a simple, durable and well-constructed hydraulic jack. It is simple of operation, requiring no particular effort and will lift any load required in regular automotive service. This jack is operated in the following manner: Place the handle on pump arm close to the head of the jack, holding in this position while pumping the jack to lift load, until desired height is obtained. To lower jack, pull handle out about 1/2 in. on pump arm and push down as far as possible. This releases the oil from under the plunger, and allows the jack to lower load easily. This jack is made in two sizes: 1 1/2-ton, listing at \$7.50 and 7 1/2 tons, listing at \$15.



### No. 47 Simplex Truck Jack

This jack, made by Templeton, Kenly & Co., Ltd., 1020 S. Central Ave., Chicago, Ill., with its 7 1/2-ton capacity is a miniature of the 35-ton Simplex railroad jack. It embodies the same gear mechanism, differing only in being of smaller proportions. The frame is of malleable iron and the working parts are drop forgings. The auxiliary detachable shoe is also a drop forging and is an advantageous feature in that it provides extra lifts. This model is one of eight other Simplex models designed for truck equipment from 3/4-ton speed models to 7 1/2-ton heavy trucks.

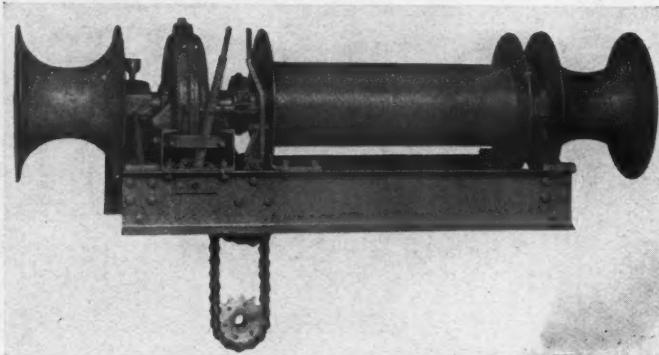


### New Ajax Red Base Jack

This new Tip-over head model Ajax jack, one of the latest additions to the line of the Ajax Auto Parts Co., Racine, Wis., because of its tip feature, provides a double-lift range without increasing its bulk, weight or mechanism. One flat heavy spring and two dogs constitute the complete working mechanism of this jack. This jack is made in two models to accommodate weights ranging from 3000 to 4000 lb. and lists for \$2.75 and \$3.50.

# 1923 MOTOR TRUCK SHOW

## HOISTS AND WINCHES



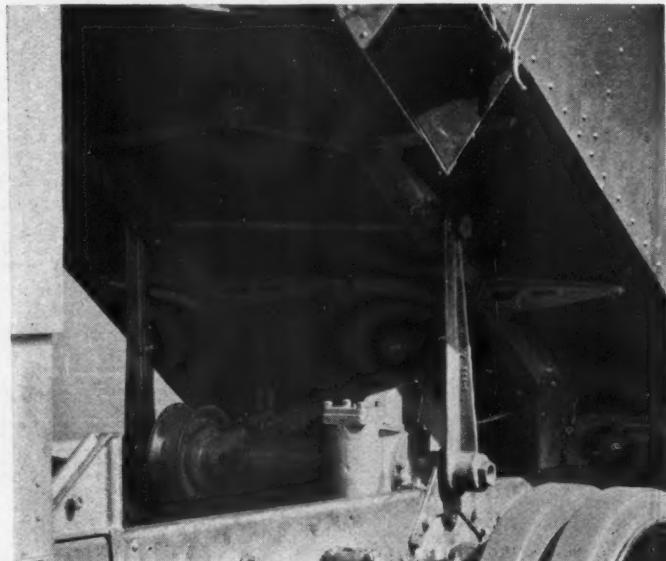
### Schaefer Heavy-Duty Power Winch

This winch is equipped with reverse drive, and is reversible under load. The large bronze worm gear and steel worm run in oil and are of the self-locking type. The winch, when mounted on truck frame sets very low, therefore taking up very little of the valuable load space of the body. It is manufactured by the Gustav Schaefer Wagon Co., 4166-4180 Lorain Ave., Cleveland, O., which concern also builds power log loaders, lumber roll-off bodies, motor bus bodies, moving vans, armored bank car bodies and all other types of commercial car bodies.

### Pyramid Mechanical Hoist Winch

The novel feature of the Pyramid Mechanical Hoist Winch, built by the Pyramid Engineering Corp., Buffalo, N. Y., lies in the method of dumping the contents of the body whereby the internal strains and stresses due to the dumping effort are reduced to a minimum. Through the employment of Rock levers in the form of a Kinematic Link chain, the dumping is accomplished in such a manner that the center of gravity of the body describes a wide, nearly horizontal and rearward pointing arc.

Another feature of this hoist is the addition of a power capstan or winch, which forms an integral part of the standard equipment. The location of this capstan is such that it does not interfere in the least with the use of a dump body. The value of the horizontal displacement principle of this hoist winch is illustrated by the fact that the dumping effort required is so slight that the engine can be throttled down so that it is barely turning over. The truck body can be partially elevated and returned to normal if so desired without having to go through the complete dumping cycle, a very useful arrangement where one load has to be dumped in different places. This feature is operated through a small lever placed within the most convenient reach of the driver.



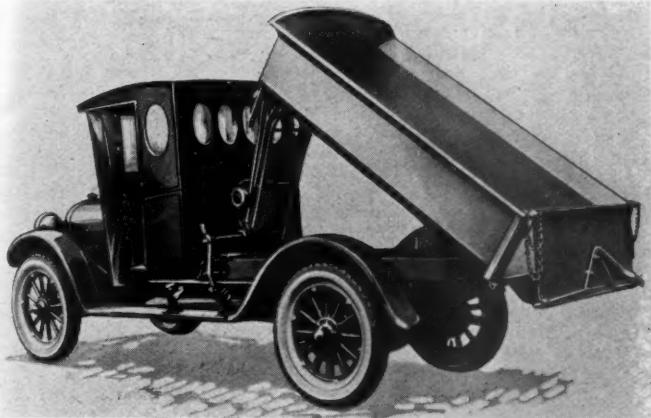
### Mead-Morrison Motor Truck Winches and Cranes

The Mead-Morrison Mfg. Co., of East Boston, Mass., are well-known to the trade as manufacturers of a complete line of motor truck winches and cranes. Their products include:

- 2 models Horizontal Capstan Winches.
- 2 models Vertical Capstan Winches.
- 6 models Friction Drum Winches.
- 1 model Underslung Friction Drum Winch.
- 1 model Motor Truck Crane.

All winches and cranes are furnished with complete mounting and driving parts. The illustration shows a crane being handled by a drum winch.

# 1923 MOTOR TRUCK SHOW



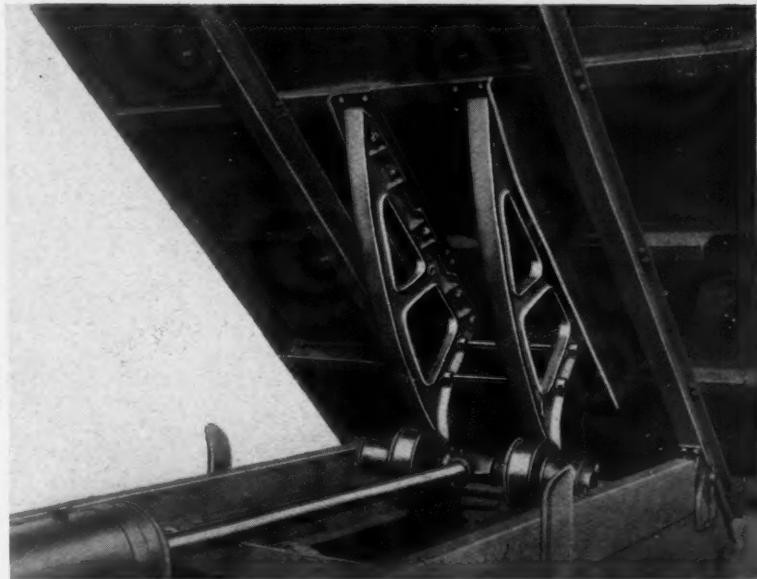
Showing the Hoisting Arrangement of the Galion

Some of the important features of this dump body, built by the Galion Allsteel Body Co., Galion, O., are: the hoisting arrangement, simplicity of installation, and the fact that it will fit any standard make truck from one to three-ton capacity. The hoist is arranged with gearing apparatus so as to lift any heavy load with ease and speed.

### The Wood-Detroit Underbody Hydraulic Hoist

The Wood-Detroit Underbody Hydraulic Hoist for placement inside the frame and underneath the body, consists of a horizontal cylinder in which is a conventional piston, fitted with expanding rims similar to those employed in internal combustion engines. Attached to the piston rod is a cross head, carrying two sets of two rollers each. One set of rollers run on steel tracks mounted in the frame, and the others operate the cams which elevate the body. The hoist is operated with oil, supplied by gear pump.

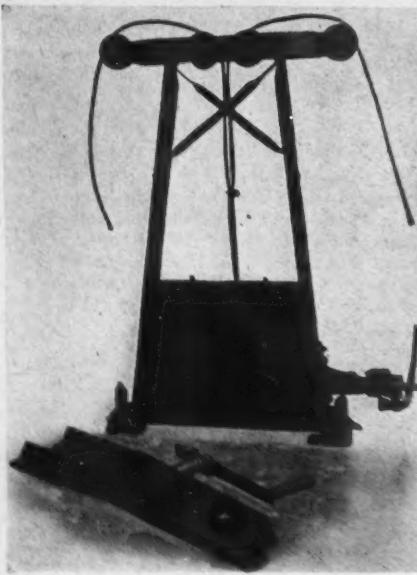
The body is hinged at the extreme end of the frame, with practically no overhang. The underbody construction allows a full length body which is desirable for combination jobs. The Wood-Detroit Underbody is made by the Wood Hydraulic Hoist & Body Co., Detroit, Mich., in a full range of capacities.



### Farmers Have Need for Trucks With Versatile Bodies

Included in the line of the Hannibal Truckbody Co., Hannibal, Mo., is the farm body illustrated herewith, designed for mounting on a Ford chassis. It is the Model D Grain Tank body in combination with a Model B Platform, Model C Express body, and a Model A Rain or Shine cab. A body of this description is indispensable to the farmer as it will serve him in a multitude of requirements. Besides making a high grain box for farm use, this job will serve admirably as a High Body Express for delivery of bulky materials and makes fine equipment for sash and door companies or for hauling manure, fruit crops, etc. The grain tank has a capacity of 60 bu.

# 1923 MOTOR TRUCK SHOW

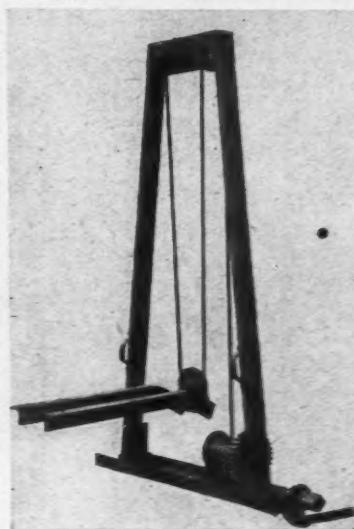


The Columbian Lightning Hand Hoist

This type of hand hoist, on the left, is manufactured in two styles, known as Type B or standard type, and Type C. The patented feature of this hoist lies in the plow steel lifting cables which wind concentrically (over and over themselves) on the cable drum, making the speed of elevation increase as the body approaches its highest angle. Likewise the speed of descent is decreased as the body nears its riding position on the chassis frame. As the body elevates, a spring device at the base of the hoist allows the hoist to tilt toward the body to such a degree that the pull on the cables is perpendicular to the lift arms of the body at all times, insuring easiest hoisting and elimination of undue strains on body or hoist.

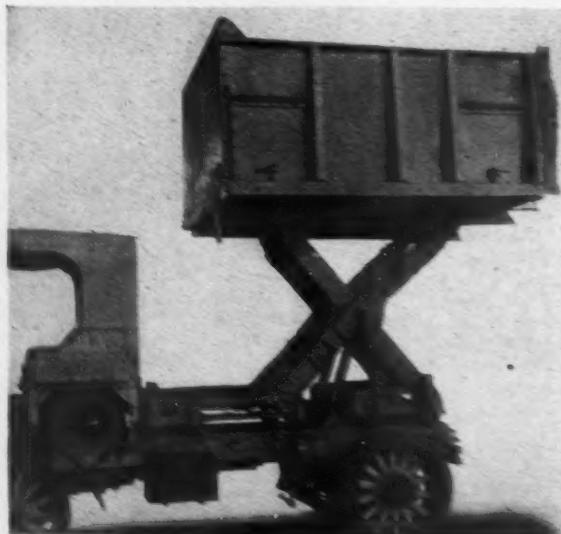
Descent of the body to normal riding position is by a clutch brake and may be held at any elevation. Model C differs from Model B only in the construction at the top carrying sheave wheels.

The gear reduction, approximately 60 to 1, transmits tremendous power, enabling a man to dump a five-ton load with ease. The Type C illustrated, requires 8 in. of chassis space. This hoist is manufactured by the Columbian Steel Tank Co., 1405 W. 12th St., Kansas City, Mo.



Rock Type H Hoist

This hoist can be applied to any truck up to 3½ tons capacity and to frames from 30 in. to 39 in. in width, without change. No holes are required to be drilled in the truck frame for fastening the hoist. A ratchet is provided to hold the load in any position and a brake permits the body to be lowered quickly and with little effort. The total space required for the hoist between the body and the cab is 8 in. and the total height above frame is 72 in. The weight of the hoist is about 215 lb., and that of the body hinge is 45 lb. The dumping angle obtained is from 35 degrees, depending upon the length of the body. This hoist is manufactured by the Rock Manufacturing Co., Waterloo, N. Y.



Heil High Lift Dumping Equipment

The Heil High Lift Dumping Equipment, as mounted on a 5-ton Autocar, is rapidly attracting the attention of large coal operators in all parts of the country. It gives greater utility to the body equipment for the reason that it can be used both as a high lift mechanism, elevating the floor of the body to a position 9 ft. from the ground, or as a standard dump job, giving a dumping angle of 45 degrees.

Between these two points there are a number of other degrees of elevation which can be secured by changing a pin in the lifting segment.

The high lift mechanism consists of three parts: Body, lifting mechanism and hydro hoist. The tremendous power of the hydro hoist is brought into play in this high lift mechanism. The equipment can be mounted on any make or model of truck. Built by the Heil Co., Milwaukee, Wis.

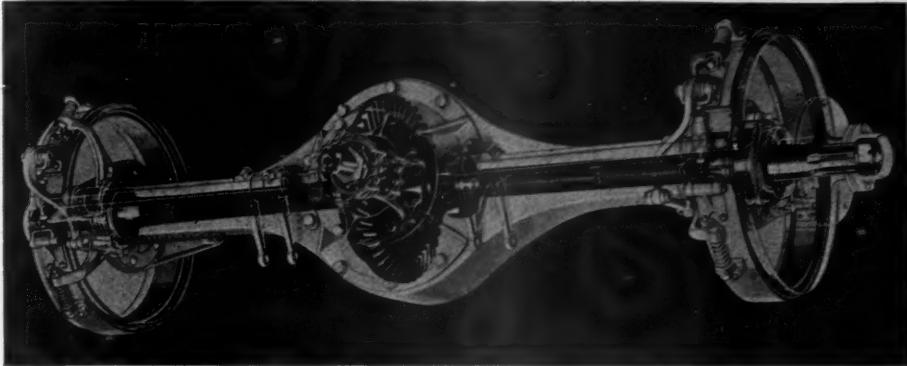


Silent Hoist All-Steel Jaw Clutch Drum Winch

This drum winch, Model TA, is for mounting on the chassis in back of the driver's seat. It is made entirely of steel and bronze. Its capacity is 12,000 lb. on a single line at approximately 50 ft. per minute. The drum holds 1100 ft. of 3½-in. wire rope. This winch is furnished with two control levers, one for the clutch, the other for the brake. This control equipment, together with ratchet segments, is usually located in some convenient position alongside of the driver's cab. One or two winch heads can be furnished. This winch weighs complete only 390 lb., and takes up but 18-in. of space. The Model TA winch, together with a reverse gear transmission, is used by telephone, telegraph, gas, electric and other public service corporations for cable pulling, hoisting, pole setting, etc. It is manufactured by the Silent Hoist Co., Brooklyn, N. Y.

# 1923 MOTOR TRUCK SHOW

## FRONT AND REAR AXLES

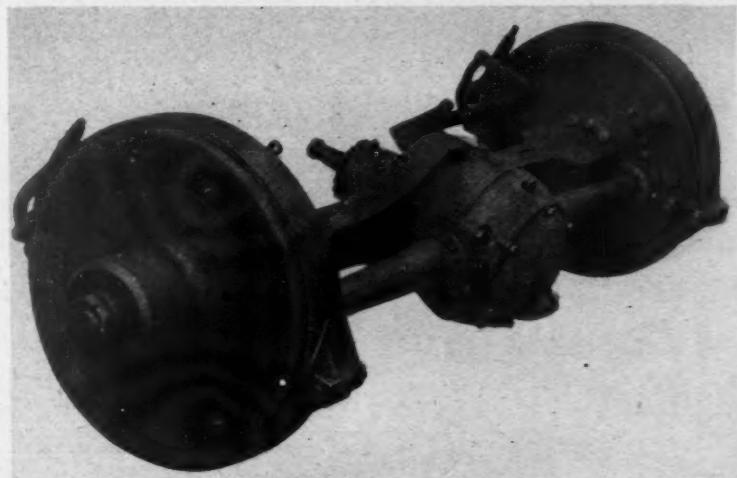


B-650, 2 to 2½ ton, bevel drive; 2-D, 2½ ton, internal gear drive; and 3-H, 3½ ton, overhead drive. The company also manufactures a specially designed motor bus axle for the Fifth Avenue Coach Co. Models of steel disk and spoke truck wheels are included in the Clark line.

### Clark Offers a Complete Line

A complete new line of bevel gear axles designed for motor trucks from  $\frac{3}{4}$  to 2½-ton capacity features the exhibit of the Clark Equipment Co., Buchanan, Mich. The smaller model is also designed for passenger car service. Besides the bevel gear models, this company is also exhibiting one model of its overhead drive axle and a cut-out model of an internal gear drive axle.

Their complete exhibit is as follows: B-300,  $\frac{3}{4}$  to 1 ton, bevel drive; B-360, 1 to 1½ ton, bevel drive;



### Torbensen Type C Axle

The Type C Torbensen Axle, one of the models of the line of the Torbensen Axle Co., Cleveland, O., is designed for use on trucks of 2 to 2½-ton capacity. The load-carrying member is a special drop forged I-beam with expanded hole at center for support of the differential carrier. This type of load-carrying member and its method of supporting the differential is protected by basic patents. No weight is carried on the operating parts. Torbensen axles are furnished in sizes from  $\frac{3}{4}$ -ton speed wagon to 3½ capacity.



### Walker Balance Drive Axles

The axle shown herewith is representative of the line of the Walker Axle Co., Chicago, Ill., as far as general design is concerned. The only difference between the other types is the size of the different units in the axle. The outstanding feature is the balance drive principle with the floating drive pinion. Through this arrangement the claim is made that it is possible to obtain high sustained efficiency throughout the entire life of the gears.

The wheel gears are encased in an oil-tight, dust-proof hollow wheel housing. The housing is required to carry only the truck and pay-load, and is relieved of the excessive torque reaction which accompanies any axle having a single reduction at the differential unit. All those parts of the axle, subjected to loads and wear, are made of special alloy steel. The bearings are of ample capacity.

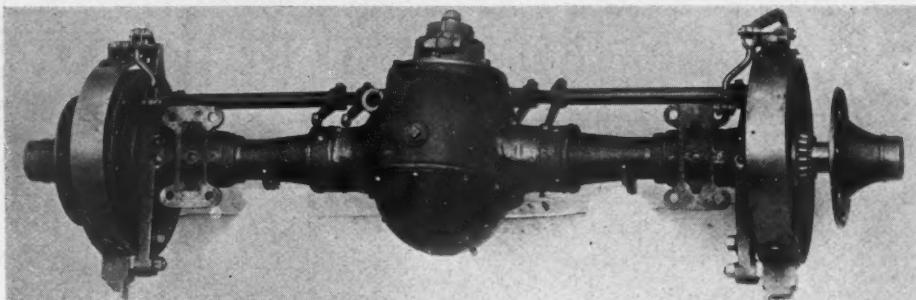
of own design and run continuously in a bath of oil. Inasmuch as the principal reduction is made in a wheel, the housing is required to carry only the truck and pay-load, and is relieved of the excessive torque reaction which accompanies any axle having a single reduction at the differential unit. All those parts of the axle, subjected to loads and wear, are made of special alloy steel. The bearings are of ample capacity.

# 1923 MOTOR TRUCK SHOW

## New Bus and Speed Truck Axle

The Flint Motor Axle Co., Flint, Mich., has brought out a new one-ton axle designed for speed trucks and buses. The axle is full floating with two large bearings in each wheel. These bearings are standard size and can be furnished in any make. Simplicity is the feature of one-piece gear case which is of malleable iron. The carrying housing is of the built-up form, using the case as a center portion with 3 in.

main tubes pressed into each side. A rear opening permits removal of entire differential if necessary. Differential is of the four-pinion type with spiral bevel cut teeth gears; all gears made of nickel-steel. It is mounted on two large bearings. It is also provided with a gear adjustment. The pinion is mounted between two ball bearings or straddle-type mounting. It is very rigid and the bearings are ample in size to withstand all universal joint whipping strain as well as the motor torque and gear pressure. The alloy steel main shafts are 1½ in. in diam. and have six-spline fitting on each end. They are both shafts of the same length. Both types of brakes are furnished for service and emergency use. It can be made for Hotchkiss drive or for torque arm drive, and can be equipped with 4.9 to 1 or 5.5 to 1 gears.

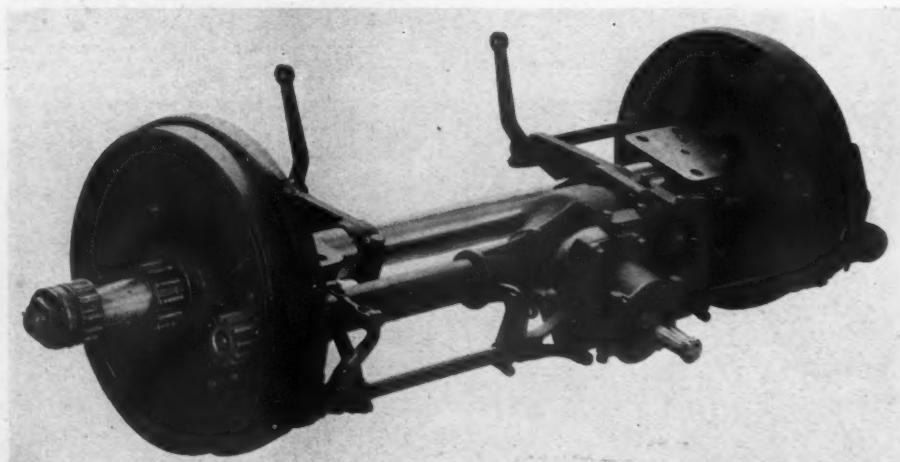


a special Brown-Lipe-Chapin with spiral bevel drive gear and pinion mate. Both the differential drive gear and the internal gears are splined to their respective carriers. This method of attaching is said to relieve the usual attachment of bolts of all torsional and shearing stresses and insures continuously quiet and true-running gears. Brakes are single internal expanding. All gears and bearings operate in a constant bath of oil. These axles are designed for Hotchkiss drive, but brackets for radius rods can be furnished. Two models are offered: Model LC8, with permissible load on spring pads of 8,000 lb.; and model LC12, for a load of 12,000 lb.

## Atlas Axle for Motorbuses

The Atlas Axles, manufactured by the Atlas Axle Co., Wilmington, Del., is specially designed for motorbus service and other low center of gravity applications. They afford an extremely low floor height without the necessity of kicking up the frame or underslinging the springs. A clearance of 8 in. remains with 36-in. wheels. The propeller shaft angularity is not excessive. The load-carrying member is cast in one piece and encloses and protects all driving members. The differential removable as a unit from the front, is

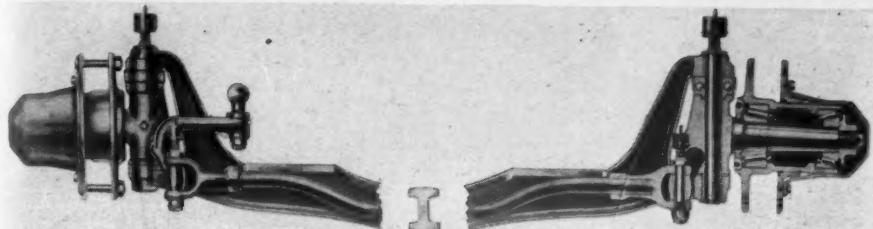
available as a unit from the front, is



## Russel Brings Out New Heavy-Duty Axle

The Russel Motor Axle Co., Detroit, Mich., Division of the McCord Mfg. Co., recently developed a new 2½-ton axle. This new model follows the general characteristics of the regular Russel type of double reduction axles, but in addition, possesses several other important features. The differential is of the 4-pinion type with both halves of the cases made of heat-treated drop forgings. The torque reaction is taken through a heat-treated chrome-nickel steel tube, which is splined into right-hand side of differential housing and also into a heat-treated, drop-forged collar, which is rigidly secured to the right-hand brake. Spider by two chrome-nickel steel bolts known as model 82. The left-hand tube is also splined into the differential housing, but is permitted to float in the left-hand brake spider in order to provide for deflection of the dead axle under load. Bower roller bearings are fitted as standard equipment, but provision has been made to permit the use of other types of roller bearings. Provision has also been made for adjustment of the external brakes without disturbing the brake rod adjustment. This axle is also available for bus use, with either the standard tread or wider treads up to 70 in.

# 1923 MOTOR TRUCK SHOW

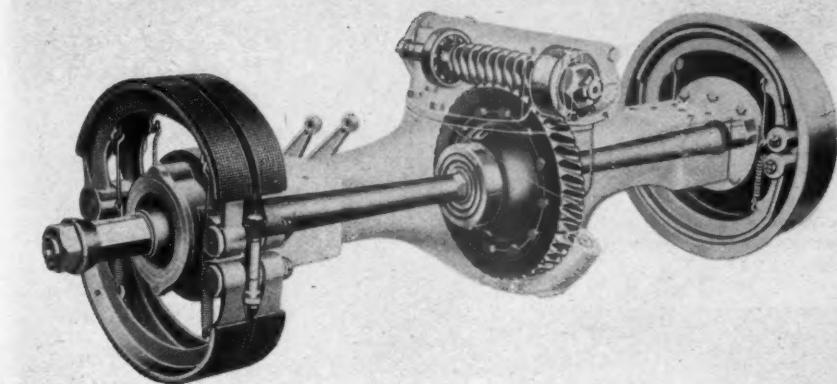


## Sheldon Front and Rear Axles

The Sheldon Front Axle is of I-beam section and is drop forged in one piece. Steering arms and knuckles are also drop forgings. Clevis pins, ball pins and pivot bolts are hardened and ground to size, all having extra large wearing surfaces. Ball thrust bearings are used in the yoke to make steering easy. Bolted-on hub caps are used, protecting the outer hub from injury in case of collision. Tie rod and wheel bearing adjustments are simple and efficient.

The Sheldon semi-floating worm drive rear-axle has a housing made of one-piece cast steel. A straight or David Brown type of worm mounted on ball bearings is used. The worm wheel is of manganese bronze and the shafts are of forged 3 1/2 per cent nickel-steel. The differential is oversize.

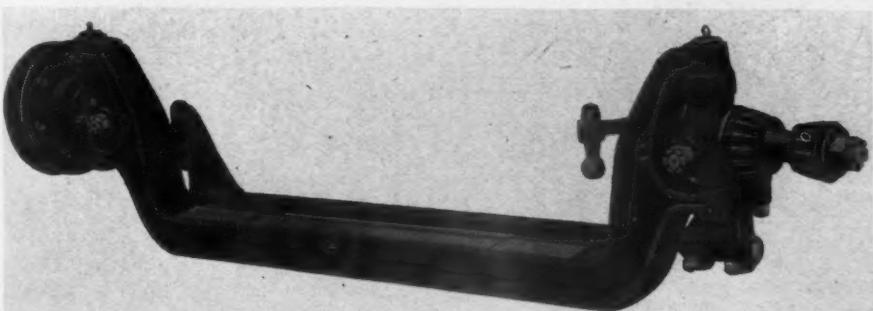
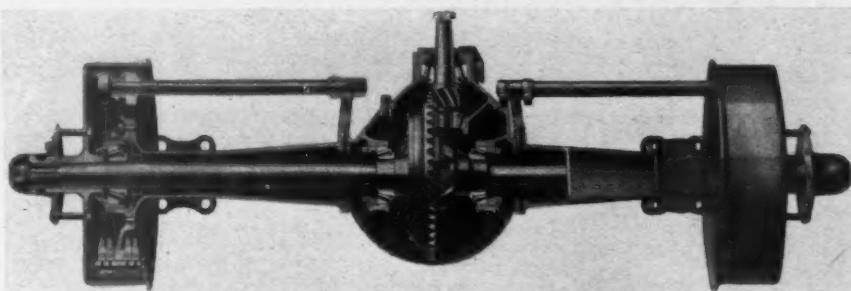
The shafts are tapered from the wheel bearing to the differential, giving strength where needed for every load put on it. Brakes are double internal, of the floating type. All parts are accessible and easily lubricated. The Sheldon Axle and Spring Co. is located in Wilkes-Barre, Pa.



## Eaton Model 1000 for Speed Trucks

Pneumatic tires and high torque motor are said to be assumed in the design of this axle. It is pointed out that these factors are of prime importance, for they are essential elements of the high-speed one-ton truck. This axle is of semi-floating construction with the wheel fastened solidly to the drive shaft, the shaft revolving in the housing on a taper roller bearing mounted in a spider attached to the ends of the housing.

The axle shafts are designed to slip the wheels under full normal load without over-stressing. The inner ends of the shafts have ten splines which engage the differential side gears, the ends of the shafts being butted together to take care of the side thrust on the rear wheels. The axle is self-contained and dust-proof, providing a positive seal for the lubricant contained in the housing. The axle housing is made of pressed steel with square sections at the spring seat locations to accommodate adjustable spring seats. It is designed for Hotchkiss drive and may be equipped with radius rods if desired. The driving gear is of the spiral bevel type. Optional gear ratios are 5 1/2, 5 5/8, and 6 1/7 to 1. Built by the Eaton Axle Co., Cleveland, O., axle division of the Standard Parts Company.



## New Design Shuler Coach Axle

Shuler Axles, products of the Shuler Axle Co., Louisville, Ky., are of such design as to stand up against grueling duty and provide constant service and long life. The materials employed in construction are of special selection. All forgings are specially heat-treated under the direct supervision of Mr. Shuler.

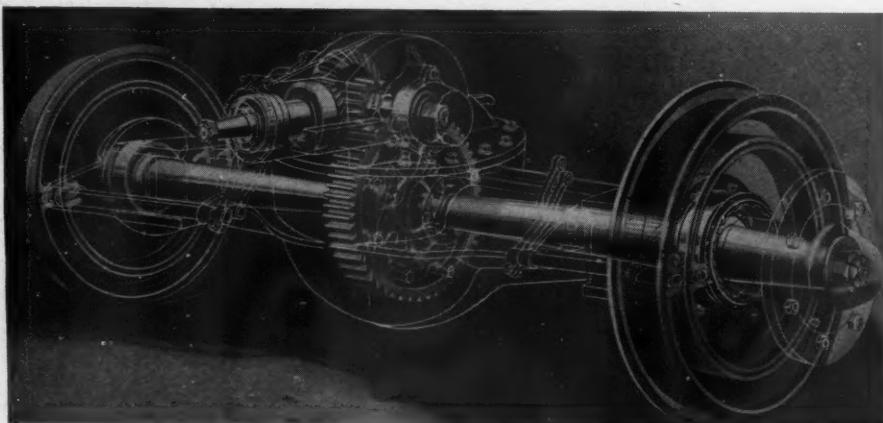
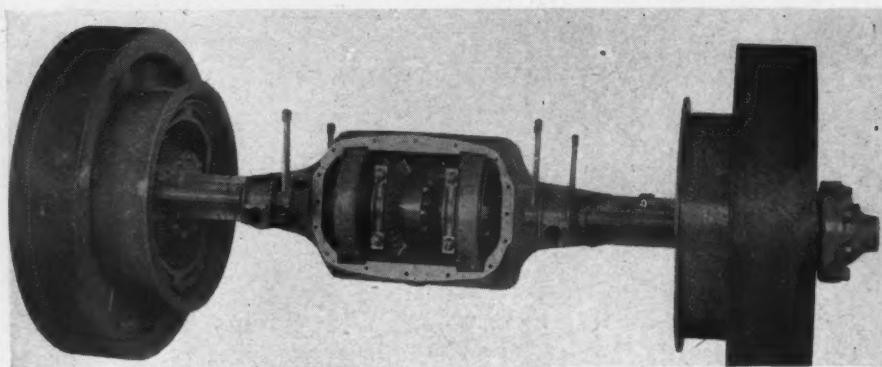
The men employed in the manufacturing and inspection departments are skilled mechanics and are carefully selected for their particular duties. This company builds axles exclusively for motor coaches, trucks, trailers and tractors. The line is complete, with specialized units to meet any requirement.

# 1923 MOTOR TRUCK SHOW

## Five Models in Huck Line

Huck Axles, made by the Huck Axle Corp., Chicago, Ill., are the result of three years of experimental development work carried on by a group of men highly trained in the automotive industry. To date trucks equipped with Huck axles have operated in the oil fields to the extent of some thirty or forty thousand miles. They are built in the following sizes: Model 15, 1½ ton capacity; Model 25, 2½ ton; Model 35, 3½ ton; Model 50, 5 ton; Model 85, motor buses requiring a wide track, nominal capacity 2½ ton. An extremely wide range of gear ratios are supplied for all models.

The unit construction of the entire driving mechanism insures a perfect alignment and lubrication of the gears and bearings in the driving mechanism, resulting in long life. Only bevel and spur gears are used, bringing about efficiency of power transmission. Simplicity, accessibility, light weight, road clearance, effective and easily adjustable brakes are features.



in which the pinion is integral with the pinion shaft mounted on ball bearings, and the ring gear is mounted on a splined cross shaft, which also carries the spur pinion of the second reduction. The spur pinion in turn meshes with the bull gear positioned on the differential.

All of the gears are located at the axle center, where they are rigidly maintained against factors tending to affect their alignment, and where it is possible to secure continuous and positive lubrication from the oil contained in the housing bowl.

## Double Reduction Models Are Offered in All Sizes

The Wisconsin Parts Co., Oshkosh, Wis., is in production on a complete line of Double Reduction Models, including the following capacity ratings: 1½, 2, 2½, 3, 3½-4 and 5 tons. In addition, special designs for buses and rail cars are also made.

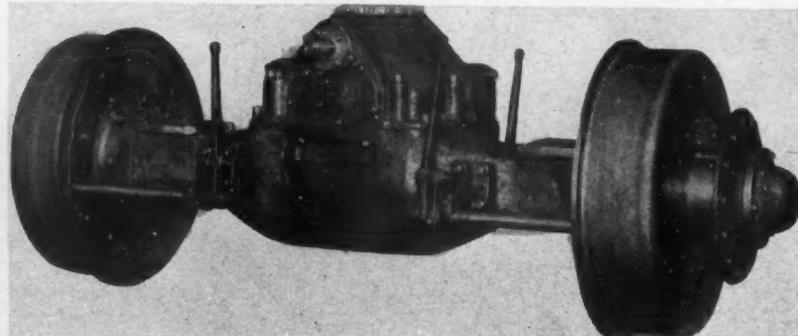
In the bus design, the gear arrangement differs from that shown in the illustration in that all the gears are centered in a common horizontal plane such that the pinion shaft is located at the same height above the ground as the wheel centers. This arrangement increases the top clearance, and permits low body suspension.

In the Wisconsin Double-Reduction design the drive from the propeller shaft is transmitted through spiral bevel gears

## Two Models of L-M Axles

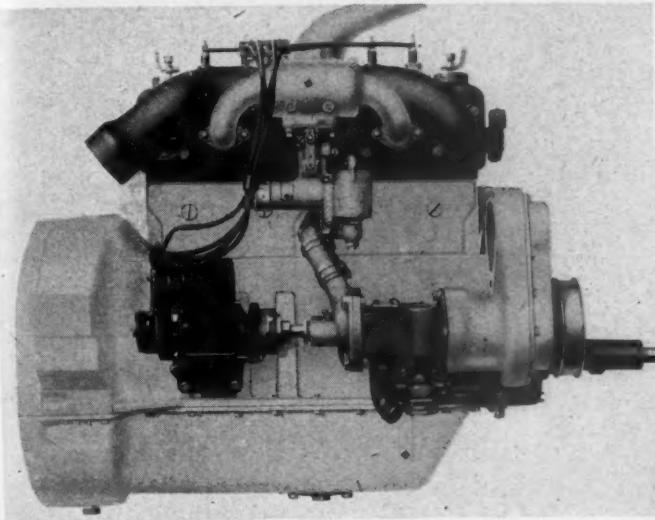
Strength, efficiency and durability are claimed for the axles put out by the L-M Axle Co., Cleveland, O. The two models characteristic of the line are No. 7250, a 2½-ton axle accommodating a spring pad load of 8,000 lb.; and No. 7500, a 5-ton axle accommodating a spring and pad load of 15,000 lb. The former is featured by its double-reduction construction and the latter its triple construction. The straight line drive makes these axles interchangeable with present worm drive axles. Assembly is such as to permit easy access to differential, gears and bearings and simplify inspection and service.

Thorough lubrication is assured without churning or loss of power. Only the slow speed gears are constantly immersed in an oil bath. The differential is located on the propeller shaft and is said to be subjected to only very light strains as the power reduction takes place after power has been transmitted through the differential. Because of the two sets of gears for each reduction, the Tandem Duplex Drive construction is claimed to assure longer life and wear. It gives greater gear-tooth surface and consequently less gear wear.



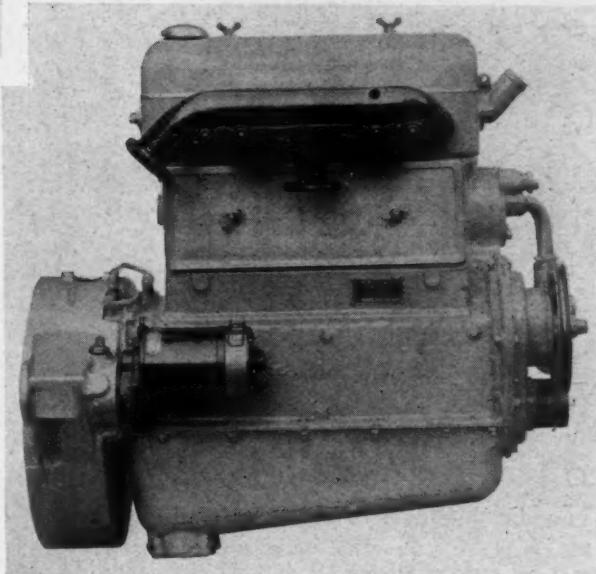
# 1923 MOTOR TRUCK SHOW

## MOTOR TRUCK ENGINES



### The G. B. & S. Model AA

Among the features in the design and construction of the three-point suspended model AA, 4-cylinder, cast in block, L-head type  $3\frac{1}{4} \times 5\frac{1}{2}$  in., G. B. & S. engine are positive lubrication, efficient cooling and the development of ample power at moderate speeds with the use of low grade fuel. The following is a brief resume of its units: Large three-bearing crankshaft and large camshaft. Bearings are all bronze-backed and babbitt shell-lined. Cooling is either thermo-syphon or centrifugal pump. Force feed oiling system. Crankcase is of Lynite. The lower half is detachable. Valves are enclosed and accessible. Complete vaporization is afforded by a hot-spot manifold, which also insures fuel economy and gives better acceleration. The hinged cover breather pipe is also a feature. Helical cut gears are used for the timer. If magneto is not used the generator can be applied where magneto attaches and provision is made for installing distributor independent of generator. This engine develops  $27\frac{1}{2}$  hp. at 950 r.p.m.; 31 hp. at 1075 r.p.m.; and  $37\frac{1}{2}$  hp. at 1250 r.p.m. Weight is 25 lb.

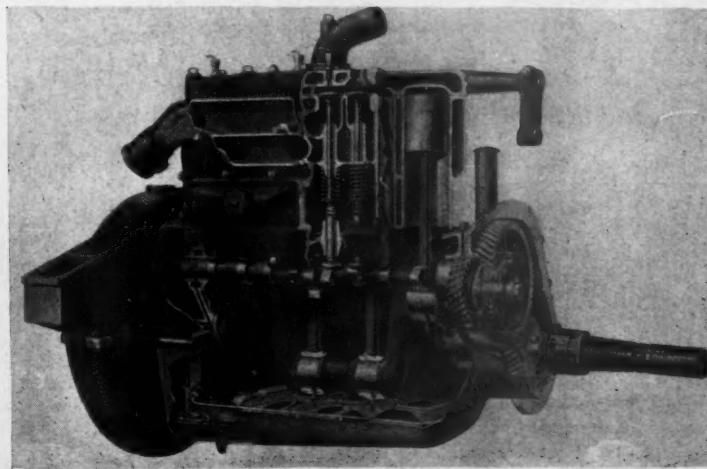


### The Weidely Model MAT

This engine, built by the Weidely Motors Co., of Indianapolis, Ind., has cylinder dimensions of  $3\frac{1}{4} \times 5\frac{1}{2}$  in. It is arranged for three-point suspension, using No. 3 S. A. E. bell-housing to enclose the flywheel. Flywheels can be furnished for all S. A. E. standard clutch mountings. The motor is exceptionally well cooled, because of the ample water space surrounding each individual cylinder barrel. All main and connecting rod bearings are made of bronze, lined with No. 24 S. A. E. babbitt metal. Helically cut timing gears and large diameter valve tappets insure long wear.

The engine weighs 700 lb. and is rated at 22.5 hp. The oil is forced through a tubular header to the three main bearings and through a hollow crankshaft to the connecting rod bearings, also through holes drilled in the webs of the upper half of the crankcase to the cam-shaft bearings. A gauze strainer is fitted around the oil pump suction to prevent sand or grit getting into the oil. This strainer can be removed without disturbing the oil pump, under pan, or other parts.

This company also manufactures a line of engines for the tractor trade, as well as four and six-cylinder motors for passenger cars.



### Herschell-Spillman Model 7000

This engine, built by the Herschell-Spillman Motor Co., of North Tonawanda, N. Y., is the very well-known Model 7000  $3\frac{1}{4} \times 5$  four-cylinder engine, rated at 37 hp. on 2200 r.p.m. This model is advised for trucks up to and including  $1\frac{1}{2}$  ton capacity, and also for tractors. An exclusive feature is the micrometer crankshaft end-play adjustment. The cylinders are cast in block.

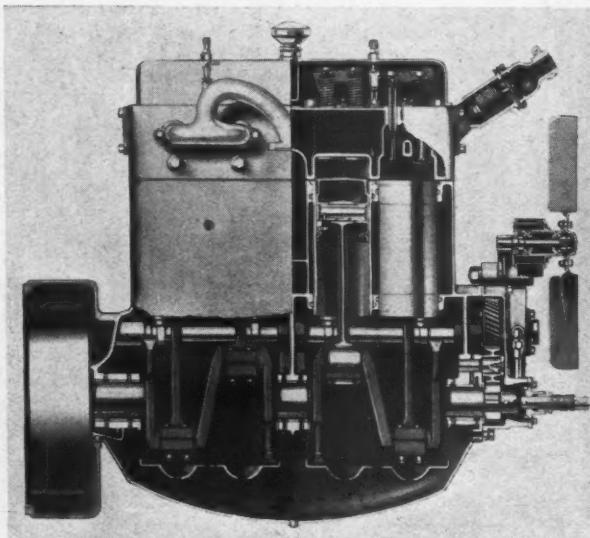
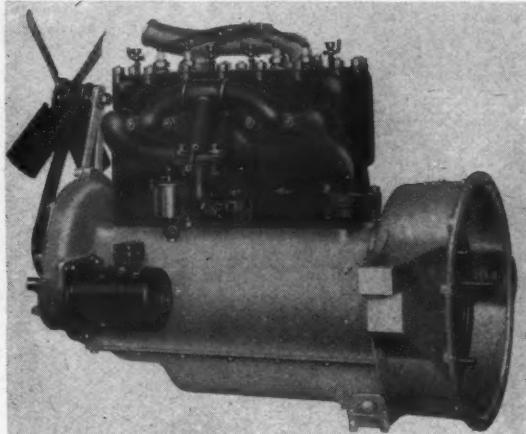
This engine can be supplied with either No. 3 or No. 5 S. A. E. bell-housing and for magneto ignition or front or rear drive distributor mounting.

This company also builds a model 11000,  $3\frac{1}{4} \times 5$  six-cylinder engine which weighs approximately 600 lb. complete with flywheel and bell-housing, and model 90,  $3\frac{1}{4} \times 5$  six-cylinder motor weighing 648 lb. and designed to take care of chassis weighing in excess of 3200 lb.

# 1923 MOTOR TRUCK SHOW

## Model H Turmo Engine

This Model H,  $3\frac{3}{4}$ -in. x 5-in., Turmo engine, shown on the right, made by the Turner & Moore Mfg. Co., Detroit, Mich., is a three-bearing crankshaft job, full pressure feed lubrication, with camshafts and tappets submerged in a bath of oil at all times. The valve tappets and stems operate in removable bushings. The incline position of the valves permit a large body of cooling water around the exhaust ports, and the valve being on an angle close to the cylinder, facilitates the scavenging of the same. The engine is built for hard, severe usage, and is particularly applicable in speed job assemblies. This concern also manufactures a  $3\frac{1}{2}$  x 5 engine delivering 40 hp. built on the same lines as the Model H.



## Midwest Truck Engines

Midwest engines, designed for trucks, tractors, railway motor cars or fire apparatus, include the following models: No. 402,  $4\frac{1}{2}$  x  $5\frac{1}{4}$  in.; No. 400,  $4\frac{1}{2}$  x 6 in.; and No. 399,  $4\frac{1}{4}$  x 6 in. All of them are the same in external appearance.

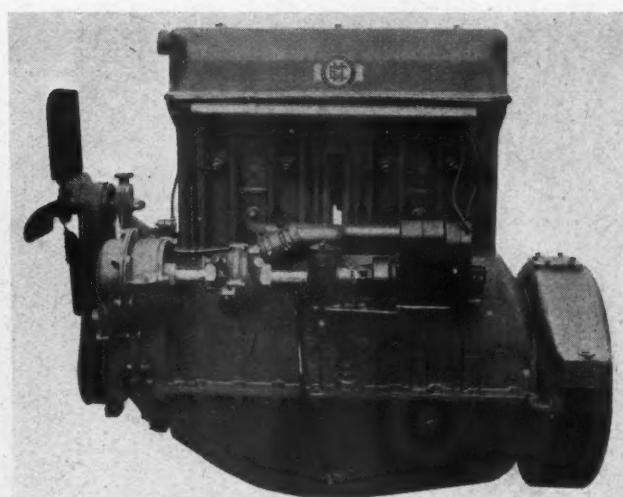
In addition to these three sizes, the Midwest Engine Corp., Indianapolis, Ind., builds the Model No. 410,  $3\frac{3}{4}$  x  $4\frac{1}{2}$  in., for speed wagons and one ton trucks; also, taxi-cabs and small passenger car service; the Model No. 411,  $3\frac{3}{4}$  x 5 in., thermosyphon type; and the Model No.  $3\frac{3}{4}$  x 5 in., pump cooled; also Model No. 610, six-cylinder engine,  $3\frac{3}{4}$  x 5 in. with maximum hp. of seventy at 300 r.p.m. This engine is suitable for buses, especially of the sedan type where smooth and quiet operation as well as high speed is essential.

The principal characteristics of all Midwest engines are as follows: Floating bearings. These are provided by making all bearings shims and grooveless and with a clearance of from .003 to .005 larger than the shaft. The bearings are burnished to a perfect finish. The space between the shaft and the bearings is filled with oil delivered continuously to each bearing under pressure, the pressure being in proportion to load on instead of speed of engine. The lubricating oil pressure is controlled by vacuum. When the vacuum is high under idling conditions, approximately 8 lb., the supply of oil to the cylinders is reduced to the minimum as the load goes on and the vacuum drops to approximately 1 lb. Under the full-load conditions, the oil pressure gradually increases until it reaches its maximum at the full load point; thus furnishing lubrication as needed and in accordance with the work being done by the engine. The floating bearings eliminate the necessity of adjustable loads as there is no weight on the bearings. Consequently there is no necessity for any method of taking up lost motion. The bearings turn black from carbon in the oil after running a comparatively short time.

## Twin City 3½ Ton Truck Motor

The Minneapolis Steel & Machinery Co., Minneapolis, Minn., shown opposite, builds a four-cylinder 16-valve-in-the-head engine, illustrated herewith. This engine is governed at a speed of 1000 r.p.m. and at that speed develops 36 hp.

It is fitted with removable cylinder walls; counterbalanced crankshaft; interchangeable bearings throughout; pressure oiling system; double valve area provided through use of four valves per cylinder; suitable for use in trucks of 3½ to 5-ton capacity.



# 1923 MOTOR TRUCK SHOW

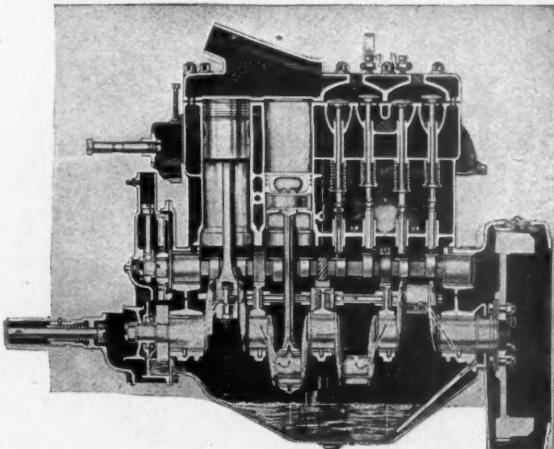
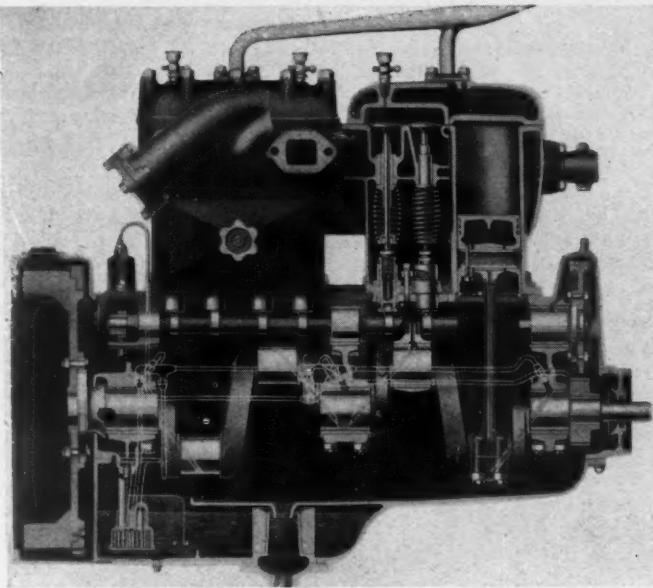
## Hinkley Heavy-Duty Automotive Engines

Built in a wide variety of sizes, covering the whole field of motor trucking, and omnibus work, Hinkley Heavy-Duty Automotive Engines, built by the Hinkley Motors, Inc., Ecorse, Mich., are all consistent to one basic design, the only difference being that of dimensions.

General design follows closely along military lines. All Hinkley engines embody such refinements as oversize, alloy-steel shafts, roller tappets, hot spot manifolds. All are lubricated by a system which strains the oil of all impurities twice on each forced circuit of the Engine. The Hinkley patented fly-ball governor, and complete lighting and starting system are optional equipment.

Exceptionally high torque, and a freedom from bearing wear are operating characteristics claimed for these engines.

Hinkley engines are supplied both as factory equipment and as replacement or exchange units in used trucks, under the provision of the Hinkley plan, which operates both direct from the company's factory and through distributors in the main transportation centers.

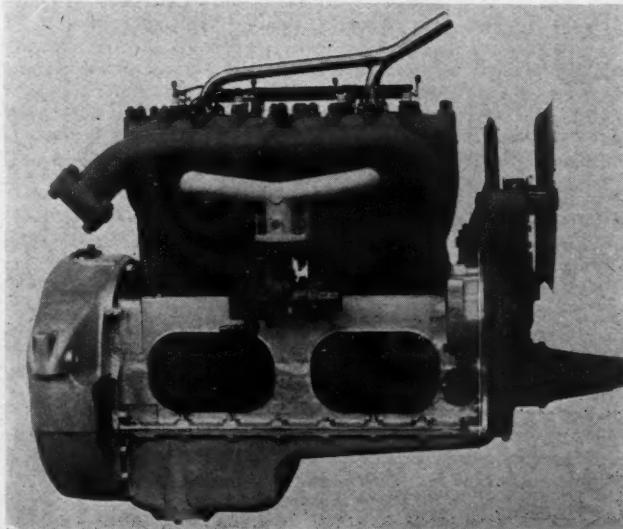


## Lycoming Model C Series of Four-Cylinder Engines

The Lycoming Motors Corporation, of Williamsport, Pa., have just recently announced a new series of Lycoming motors known as the Model C series, having a five-bearing crankshaft and a forced feed lubricating system controlled by the throttle. The bores furnished are  $3\frac{1}{2}$ ,  $3\frac{3}{4}$ , or  $3\frac{3}{4} \times 5$ -in. stroke. A description of this engine appeared in our last issue on page 54.

## High Fuel Economy in New Waukesha

The Waukesha Co., Waukesha, Wis., recently announced and tested a newly designed engine, which while retaining many of the external characteristics of its 4-cylinder,  $4 \times 5\frac{1}{4}$ , CU model, is featured by many new improvements making for sustained economy in operation. It possesses an unusually high compression ratio for an L-head type engine, a ratio of 4.56:1 having been provided on the experimental truck. This factor together with other economizing elements, results in low operating costs. As hot-spots are not conducive to high compression, this construction on the manifold has been eliminated. Provision has, however, been made for pre-heating the air before entering the carburetor. A modified form of the Ricardo combustion head has been adopted, making for greater turbulence. An aluminum piston is used. It is of such design as to run exceptionally cool. Efficient lubrication of the valve stems is assured by the projection of oil, transmitted through the drilled crankshaft into the valve chamber. Use is also made of valve rotators, which cause the valves to turn completely around on their seats once every 100 revolutions of the crankshaft.



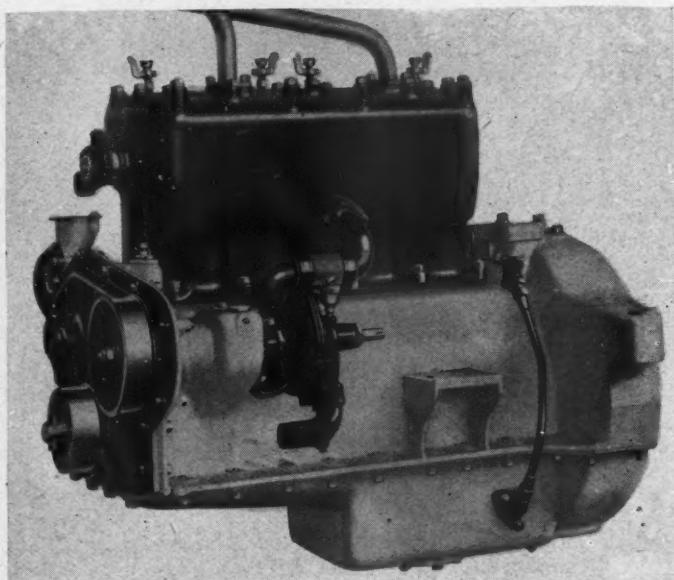
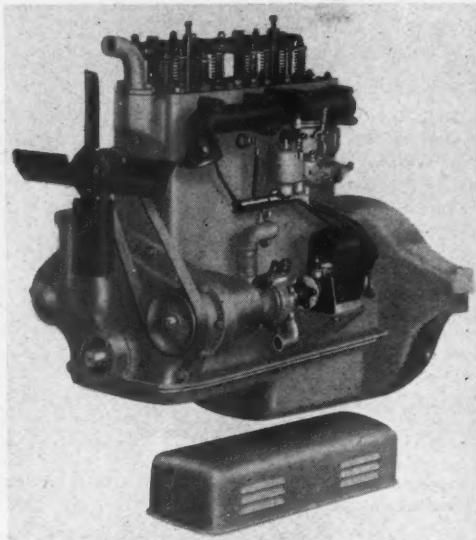
# 1923 MOTOR TRUCK SHOW

## The Wisconsin Speed Truck Engine

The illustration shows the Wisconsin model SU 4 x 5 four-cylinder overhead valve speed truck engine. This engine is especially adapted to the speed truck and at the same time has ample power to handle trucks of 1½-ton capacity. Specifications include: Overhead valves; force-feed lubrication; removable cylinder head; centrifugal water pump; valve tappets mounted on removable plates; direct oil lead to rocker lever arms; arranged for starter, generator and magneto; 50 hp. at 2000 r.p.m.

The balance of the Wisconsin line consists of models: TAU, 4 x 6; UAU, 4½ x 6; VAU, 4½ x 6; RAU, 4½ x 6; RBU, 5 x 6. All parts of the forging L-head series are interchangeable with exception of cylinders, pistons and rings.

This interchangeability feature gives the buyer the choice of engines, depending upon the nature of the work without affecting the installation problem in any way. The Wisconsin interchangeability feature will take care of all trucks from ¾ to 7 ton capacity with practically three models of engines. The weights of the Wisconsin engines range from 590 lb. for the SU 4 x 5 to 925 lb. for the RBU 5 x 6 four-cylinder engine. These engines are built by the Wisconsin Motor Mfg. Co., Milwaukee, Wis.



## Hercules Model O Heavy Duty Engine

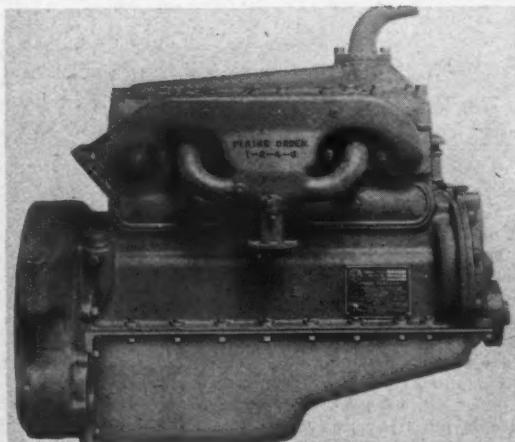
The Hercules Model O 4 x 5, four-cylinder engine has been designed to develop high power at low speeds, and at the same time stand the strain of high engine speeds which are demanded by the truck operators, due to the use of pneumatic tires and the continued development of good roads. Attention is called to the rigidity of the engine which is due to the one-piece cylinder block and crankcase. The water jacket extends the whole length of the cylinder bore, permitting uniform expansion and cooling. These features coupled with the forced feed lubricating system which has always been a feature of the Hercules engines and the careful working out of valve timing is claimed to give exceptional performance. This model is adaptable for use in trucks of from ¾ to 2½ tons.

The service angle has always been carefully considered. All parts are unusually accessible and by the elimination of every unnecessary part, or the combination of various parts, the number of different parts have been reduced to a minimum. Large size bolts and cap screws are used throughout the engine and wherever possible these are interchangeable, which permits the use of the same wrenches and cuts down the stock of such parts the dealer has to carry to give satisfactory service. The oil pan can be removed without disconnecting any oil lines or removing any parts except the cap screws holding it to the crankcase. When this is removed the connecting rods and main bearings can be easily adjusted.

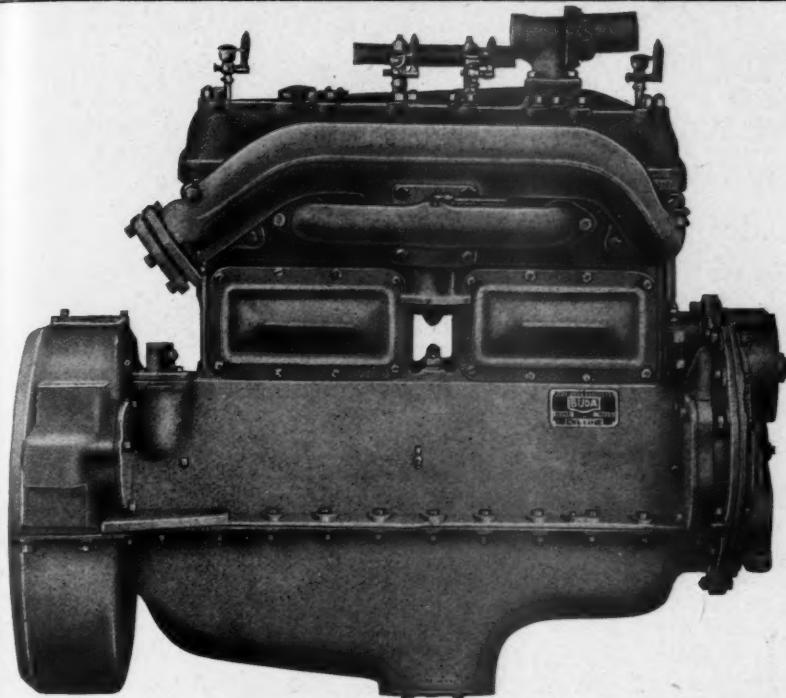
Scoring of cylinders, due to the loosening of piston pins, is prevented by cramping the pin in the top end of the connecting rod, the pin rotating in bronze bushings in the piston bosses. The engine is supplied with No. 3 S. A. E. bell-housing and flywheel to fit all standard types of clutches. This engine is built by the Hercules Motor Mfg. Co., Canton, O.

## Continental Red Seal Model K4

Illustrating the Model K4 Red Seal Continental Engine, one of four new types by the Continental Motors Corp. A striking feature of the new unit is that 77 per cent of its parts are interchangeable with the other models. Standardization makes for volume, economic and quality production. A description of the engine and line appears elsewhere in this issue.



# 1923 MOTOR TRUCK SHOW



## New Series of Buda Engines for Buses

The illustration shows the general appearance of the new series of Buda engines developed during the past year for motor coach service. They differ from the standard Buda line principally in details only.

Some of the features are special counterbalanced crank shafts for smoother operation at the higher speeds. Radiated flanged bearings on all main and lower connecting rods. These bearings are of a type adopted after three years' exhaustive testing. Pistons somewhat lighter than in the standard heavy-duty models. Thermostatic control of water circulation. Cylinder heads have a greater volume of water over combustion chambers. The oil pressure is automatically controlled in direct ratio to load on the engine. Aluminum crankcase, oil pan and lower half of flywheel housing is standard for these models.

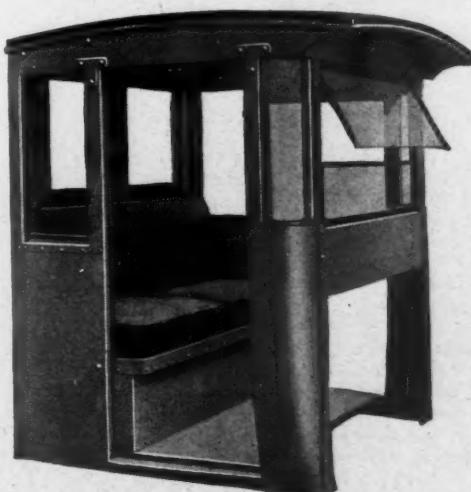
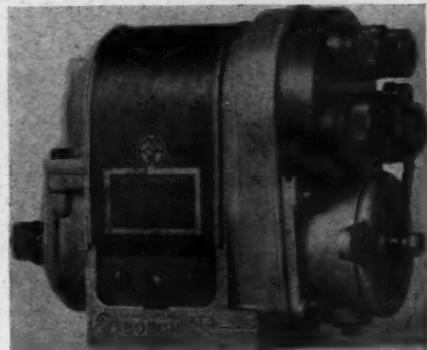
The 4-cylinder engines are made in the following sizes: CBU 3½ in. x 5½ in.; GBU 4 in. x 5½ in.; EBU 4½ in. x 5½ in.; and YBU 4½ in. x 6 in.

## The New Bosch AT Types

The AT type of Bosch Magneto represent the development of more than three years of intensive and specialized electrical and magnetic research.

The salient feature of these new types offered by the American Bosch Magneto Corp., Springfield, Mass., are as follows: They are primarily for four and six-cylinder engines of the motor car, truck, tractor and marine engine types and are adapted to industrial units such as those used for cement mixing, road construction and the like. They are of ball bearing construction and are adapted for rotation by gear, chain or shaft drive. Either variable or fixed timing may be had, and the direction of drive may be clockwise or anti-clockwise.

A Bosch Automatic Impulse Coupling may be fitted to assist the starting of large engines in cold weather. The coupling may be had in open or enclosed form. An Automatic Spark Advance Governor may be incorporated with the magneto to eliminate the necessity of manual control. If desired, both of these features may be used in the same magneto. The general design provides great strength and protects it against the ingress of water, dust and oil.



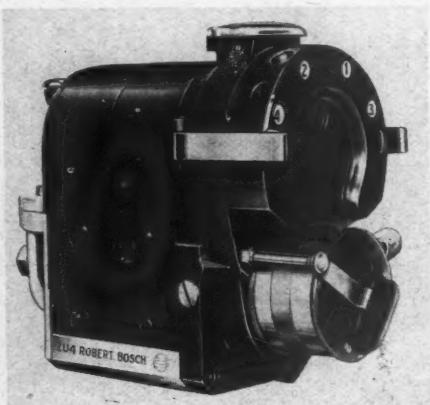
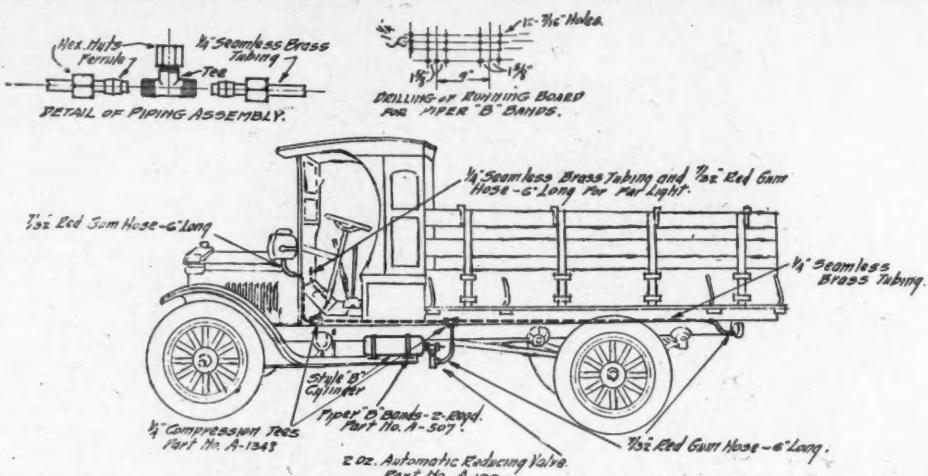
## Weatherproof Truck Cabs

Weatherproof cabs are offered by the Weatherproof Body Corp., Corunna, Mich., in every style and size for all makes of trucks. These cabs provide protection against inclement and wintry weather and are readily convertible for summer usage. They are featured by the flexible doors and construction which is claimed to assure long life despite the severe duty of truck service. These cabs are constructed of hard-wood frames, braced and bolted and finished with heavy auto-body steel. The doors which are easily operated, slide up into the roof, and the windows drop into the sides of the cab. Plate glass is used in the windshield of all models. Seat cushions are in two sections, with Marshall-type springs; the lazy backs also have springs. Upholstering is finished in wearable imitation leather.

# 1923 MOTOR TRUCK SHOW

## Prest-O-Lite Acetylene Lighting System for Trucks

The Prest-O-Lite Acetylene Lighting Equipment, put out by the Prest-O-Lite Co., Inc., Indianapolis, Ind., is easily installed on any make of truck. It is stated to provide a steady and dependable light. The initial cost of installation is small and the cost of operation and maintenance is also said to be low. This system is further described as providing maximum lighting with minimum bulk and weight. The installation complies with state laws everywhere. The types KPN batteries also put out by this company are particularly suitable for truck service as they are claimed to stand up well against the severe duty of truck operations. These batteries contain heavy plates and the patented "peened-post" construction insuring long service.



## Robert Bosch Type ZU4

As all current-conducting parts inside of this Type ZU4 Robert Bosch are insulated, complete reliability is assured. This enclosed construction gives the magneto a compact appearance and is stated to render it noiseless in operation. Water or dust cannot penetrate into the interior or reach current-conducting parts. All parts subject to wear, such as carbon brushes, platinum points and distributor are readily accessible without the use of special tools. The magneto produces a spark at the lowest engine speed with timing lever in any position. It has a high electrical efficiency. The timing lever is easily adjustable to any position desired. An inspection window is provided on the distributor so that the magneto can be timed to the engine without removing the end cap or distributor disk. This type, as well as all other models, can be furnished with an impulse coupling to facilitate starting. The Robert Bosch Magneto Co., Inc., is located at 123 W. 64th St., New York City.



## Simms Flexible Adjustable Coupling

This coupling is composed of three parts: a toothed flange containing 19 teeth, which is bolted to the extension of the pump shaft; a 20-toothed flange which is keyed to the magneto shaft; and a double-toothed disk of rubber compound, which is between the two flanges. To change the magneto timing, the process is as follows: Remove the flange bolt on the pump shaft side and slide back the flange. Disengage the rubber disk and rotate in the desired direction as many teeth as necessary and replace. This adjustable feature makes it possible to set the timing of the magneto, either in advance or retard position, to within less than one degree. No studs, bolt holes or slots limit the range of adjustment. This coupling is manufactured by the Simms Magneto Co., East Orange, N. J.



## Sasgen Truck Derrick

The Sasgen Derrick Co., of Chicago, Ill., is building a specially designed derrick for use on service cars. The construction of the derrick permits the same to be used as a towing outfit; also for work underneath the car. The boom swings a full circle and can be used in any direction, and can be locked when towing. The cable furnished with the machine is sufficiently long to reach a wrecked or tipped over vehicle 50 ft. from the service truck. It requires only one man to do the job.

# Getting the Trucks Into the Hands of the Farmers

***This Article Suggests Methods of Working Through Dealers Who Are Already in Close Contact With This Field. Knowing the Farmers' Problems and Something About Farming Highly Essential to Success in Selling Farm Trucks***

By HOWARD E. EVERETT, Managing Editor CHILTON TRACTOR JOURNAL

**A**GRICULTURE comprises two major classes of operations—production and transportation. While production is perhaps the prime objective, transportation is equally important, for production is impossible unless the raw materials are transported to the farm factory and conveyed from place to place about the farm as processes of manufacture demand, and the finished product in turn transported to its primary market.

Upon agriculture more than any other industry depends the prosperity of the country. It is the world's oldest industry, yet the most primitive in its methods. For centuries men and beasts have furnished the motive power for these food factories of the world. The machinery used in tilling the soil has been improved, notably so during the last two generations, but this machinery is still being operated largely by flesh and muscle.

As with any other manufacturing industry, the best interests of the farmer demand more efficient and at the same time less expensive power for both transportation and production. During the last two decades remarkable progress has been made toward the substitution of internal combustion engine power for the more primitive methods. Mechanical power is rapidly becoming recognized as the basis of a new system of farming. In this development of power methods, the motor truck is not keeping pace with other automotive units.

Three major internal combustion units are required to motorize farm operations—the automobile, the truck and the tractor.

On the 6,448,366 farms of the United States are found:

2,850,000 or 30.6 per cent of the 9,321,150 automobiles in the U. S.  
150,000 or 13.3 per cent of the 1,127,482 motor trucks, and  
457,000 or 91.4 per cent of the 500,000 tractors.

These figures analyzed in another way show

One automobile to every 2.3 farms,  
One tractor to every 14.1 farms,  
but only

One truck to every 43 farms.

With these facts in mind it naturally would be interesting to learn how these farmers are getting along without motor trucks, or, in other words, what they are

using in place of motor trucks; also, why they are not using a greater number of trucks.

Since that prehistoric time when some individual with more curiosity than his fellows discovered the principle of the wheel on an axle, the wagon in some form or other has been the principal transportation agency on the farm and on the rural highways. We would like to believe that the old rattling, creaking farm wagon is passing. Perhaps it is; but in 1920, 316,849 farm wagons were manufactured in the United States, and about 300,000 of them were sold to American farmers. Twice as many farm wagons sold to farmers in one year as there are trucks on American farms after ten years of merchandising! Almost as many wagons made that one year as there were trucks, 322,039 trucks having been produced during that banner year of truck production!

Why have the farmers of the United States bought three times as many tractors as trucks, when each is accorded a place on the farm quite equal in import to the other?

## Why More Trucks Haven't Been Sold to the Farmer!

Perhaps the principal reason is that the truck manufacturers have not been selling their product to the farmers. Some of them haven't a truck which can be used by the farmer. But a far greater number haven't the selling organization which reaches the farmer. The large cities are crowded with truck dealers, with competition frequently so keen that price-cutting is the only inducement which can influence sales. Yet, six million farmers who do not buy in these big city markets are at least potential truck prospects. Why can't these be reached?

To realize the possibilities of this farm market, the manufacturer must first understand the farmer's transportation problems and then provide a truck which will best meet his requirements. With the right kind of truck, the next problem is sales and distribution.

The farmer has a wide diversity of products to haul—live stock; small grain, loose or sacked; hay, loose or baled; milk; produce in baskets, etc. It is very evident that no one individual type of body will interest the farmer. The body must be convertible.

The capacity should be sufficient to meet all average loads at least. Economy demands that average rather than maximum conditions be met, but doubtless the tendency of the farmer will be to buy too little hauling capacity. From 1 to 2-ton sizes will meet the widest range of farm needs, but a 2½-ton truck can be used most profitably on many farms.

It must be remembered that the farmer doesn't have loading platforms scattered all over his farm, so that the chassis should be as low as possible. Most of the scales on the farms and at country stores, and the grain dumps at country elevators, were built for farm wagons. Consequently, the wheelbase of the truck should be sufficiently short to be accommodated by the existing facilities.

Pneumatic tires give a wider range of traction than solids. Much of the farmer's hauling is on soft ground where traction is an important consideration. Also, considerable of his highway hauling involves loads unfavorably affected by jolting and which require speed. Therefore, pneumatic tires are preferable.

Under present conditions, price is a considerable factor, which may preclude some equipment which otherwise would be advisable. A body hoist to facilitate unloading would be advantageous. The truck is used in all kinds of weather and some kind of protection for both driver and load would be desirable.

Getting a suitable farm truck on the farm is the big problem now confronting the industry. It is significant that the manufacturers of two trucks now largely dominating the farm market have sales organizations which penetrate into rural communities. The farmers in the agricultural states do most of their equipment buying close to home, which means in the smaller communities. They don't go to the big cities. In Iowa, for instance, a leading agricultural state and a state whose farmers have bought more farm equipment than any other state, there are only fourteen towns which have more than 15,000 people. There are 22 cities of from five to fifteen thousand. From one to five thousand there are 171 towns, and the number having from 500 to 1000 people is 216. It is in these smaller towns that the farmers do their buying.

There are several reasons why the farmers will not buy trucks in the larger

commercial centers. In the first place, they don't trade there. Again, these sales organizations are not familiar with the farmer's transportation problems, and, before a farmer can be sold the salesman has to convince the farmer that he knows what he is talking about. Selling trucks for farm use is a much different proposition than selling for specific industrial uses. Then, too, the farmer knows that he has to have service and he isn't keen on paying for service that has to be administered through a distance of fifty miles with vexatious and expensive delays.

The best dealer to sell trucks to the farmer is the dealer in the small town. While a dealer to handle trucks exclusively in such a community is impossible at this stage of the industry, it is possible to find an existing dealer who can merchandise trucks to farmers satisfactorily. There are at least two classes of dealers already in existence capable of representing the truck manufacturers, the automobile dealer or the tractor dealer.

Either of these dealers has the proper farmer contact. From the standpoint of giving adequate service the automobile dealer doubtless is the better of the two. The automobile dealer, however, during the last two years has confined himself largely to passenger cars. This is a business in itself and with farmers buying heavily in this market, the automobile

dealer is not inclined to handle additional lines.

The tractor dealer should appeal to the truck manufacturer. He is more of a salesman than the automobile dealer. This can be said without any reflection on the automobile dealer, for the tractor dealer has had to sell, while the automobile dealer hasn't. Furthermore, the selling problems with motor trucks and tractors are identical. Both have to be sold on the basis of utility and economy. The tractor dealer hasn't been able to give his best to that industry, for it has not offered sufficient volume as yet and he has been compelled to add other lines to carry his overhead. For the same reasons, the truck dealer cannot stand alone. But the combination of truck and tractor gives the small town dealer an ideal arrangement, with two lines, each selling to the same buyer, each selling on the same appeal, each requiring similar service and each dovetailing into the other to afford a year-round selling proposition. A more ideal rural selling combination could not be found. Both industries would be its beneficiaries.

A class of dealers that has already sold three times as many comparable units to this class of buyers as the entire truck industry in all its years, is a class not to be passed by without more than casual consideration.

The farmer is now in his most receptive frame of mind since the war. His position has been economically bad. The farmer has tried to change it by various expedients. He has been clawing Congress in the hopes of finding a legislative panacea for all his economic ailments. He has gotten some things he wanted, but they haven't benefited him to the extent expected. With it all, he has been gaining a consciousness that his remedy lies not in politics, or legislation, but with himself. He is gradually realizing that he must work out his own salvation and that the whole economic structure can't be changed just to please him. He is realizing more and more every day that he must produce more cheaply and in greater quantity and that his production must be laid down in its primary market at a lower price and at the same time with a greater profit to himself.

Consequently, the stage is set for the type of dealer who can convince the farmer that he can make profitable use of a truck. And who can do this better than the dealer who has intimate knowledge of the farmer's transportation needs and requirements, who knows his buying ability, and who has the selling background of having successfully helped the farmer with the equally important problems of production?

## What the City of Minneapolis Did to Reduce Garbage Disposal Costs

**M**INNEAPOLIS has recently put into operation a new system of garbage disposal that is saving the city many thousands of dollars. Not only has the cost of hauling the garbage been reduced, but the garbage is now disposed of within a few hours of the time it is collected, a great advantage from a sanitary standpoint, and also an advantage at the incinerator, which is operated at greater efficiency when burning fresh garbage than was possible when old, mouldy, wet garbage had to be burned. The incinerators actually consume 100 per cent more garbage, with a coal consumption 51 per cent less per ton of garbage burned.

Sixteen 1½-ton trucks are used to go through the alleys where the cans of the wrapped garbage are dumped into the tank on the truck. As soon as the tank is filled, the run is made to the nearest of four sub-stations established throughout the city, where an electric crane transfers the filled tank onto a large semi-trailer and replaces an empty tank onto the small truck, which immediately starts off for another load. Eight Fruehauf semi-trailers and two truck-tractors are employed to haul all the garbage from the sub-stations to the incinerator plant, an average distance of seven miles.

The trailers have automatic fifth-wheel couplings, so the tractors make the exchange from a loaded trailer to an empty one, or vice versa, in a minute or two.

This makes it an easy matter for two tractors to deliver 108 tanks or over 150 tons of garbage each day. The trailers carry six tanks each trip, the total load, including weight of the tank itself, running up to 11 tons.

The old system of collection consisted of hauling the tanks to the railroad siding where they were transferred to flat cars and switched once each day to the incinerator. This resulted in an average delay of about 24 hours. This delay resulted in exposure to the sun and rain, causing the garbage to become soggy and hard to burn. Also, because of the vile odor it was considered a nuisance to be hauled

through the streets. No complaints now come in from people living along the streets used for the transportation of the garbage tanks.

The new system is the result of an analysis made by the Garbage Collection Department, the City Engineer, and the Motor Transport Company, of this city. After a preliminary estimate was made, showing the possible economy, a demonstration was made by the Motor Transport Company, to show the members of the City Council Committee just how the new system could be worked. Within four months after the demonstration, the new system was in actual operation, with suitable cranes and roadways all complete.

A saving to the city of approximately \$30,000 per annum is now being effected, with a vastly improved service. The City of Minneapolis has a garbage collection service second to no city in the country.



An Electric Crane is Used to Mount the Filled Tanks Onto a Semi-Trailer

# An Analysis of Motor Truck Prices

*All Indications Point to the Fact That Prices May be Raised Rather Than Lowered This Year*

By C. S. PERRIE

DURING the past year or so the industry has been reducing prices and for the first time in a number of years the average prices show a reduction in every capacity with one exception, the 1000 lb. class. The greatest reduction has been in the 5½ to 7½-ton, the average being \$676, while the smallest reduction is noted in the 1½-ton class, which averages \$107. Marked decreases are noticeable in the 1500 lb., 1 and 1¼-ton classes, the average being \$281, \$388 and \$299, respectively. Makers of the 2, 3 and 3½-tons also cut to a noticeable degree, the average being \$330, \$274 and \$366, respectively. Taking into consideration all capacities, models, excepting the 1000 lb., the grand average reduction for all models has been \$290.

#### Are Prices at Low Point?

Reduced list prices were not unexpected in the fall of 1920 and beginning of 1921. Liquidation of inventories and conditions following a war boom have but one result, which is lower prices. But as was pointed out by the writer in the 1922 January issue of the COMMERCIAL CAR JOURNAL, the reductions at that time were not as pronounced as were anticipated. A study of the table showing the average prices by models from 1916 to 1922, inclusive, will show that liquidation was not very complete at the end of 1921. At the beginning of 1922 makers of six capacities, namely, the 1, 1¼, 3, 3½, 4 and 5-ton, reduced \$182, \$58, \$43, \$12, \$115 and \$155, respectively, or a grand average reduction of \$94. On the other hand, four models, the 1500 lb., 1½, 2 and 2½-ton advanced prices \$70, \$133, \$30 and \$212, respectively. The grand average advance was \$111.

#### Cut Pronounced in Light Models

Analysis by models and taking the 1000 lb. capacity first, it will be noted that the low price was \$689 in 1916, and high

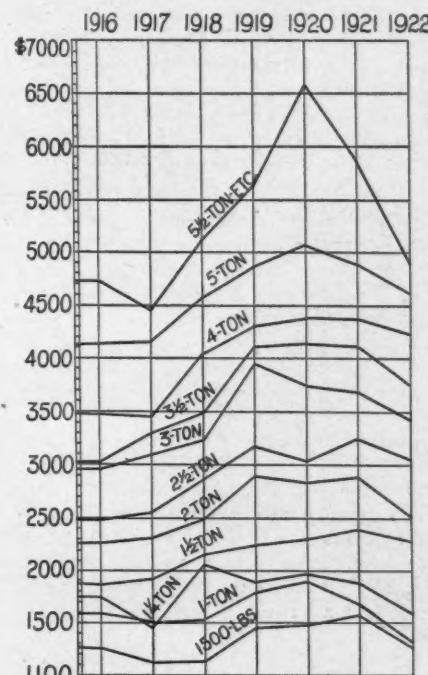
in 1921. The average for 1922 is the same, \$970. The factors of supply and demand appear to have functioned in the case of the 1500 lb., which average price was \$1179 in 1917, but increased steadily up to and including 1921, when it was \$1560. At the close of 1922, however, the makers cut off an average of \$281. The 1-ton dropped its price \$93 in 1917, but thereafter the price advanced steadily until 1921, when it was cut \$182. In 1922 it was further reduced and with the exception of the 5½ to 7½-ton class, the reduction was the greatest.

The fluctuations of the 1¼-ton capacity group show a reduction on the odd years and an increase during the even years. The low peak was in 1917, \$1472. In 1921 the price was reduced \$58. 1922 saw the average price reduced \$299. The curve of the 1½-ton shows a steady increase in average price from 1916, when it was \$1881, to 1921, when it was \$2389. The reduction in 1922 was \$107.

#### The Two-Ton Has Erratic Curve

The average price of the 2-ton increased from \$2272 in 1916, to \$2908 in 1919, fell off \$86 the following year, but advanced \$29 in 1921. Last year the greatest increase was \$418 in 1919. The biggest cut was \$330 in 1922.

The 3½-ton, which increased steadily from \$3009 in 1916, to \$4144 in 1920, is another case of a marked cut. In 1921 the



#### Average Prices by Models, 1916 to 1922, Inclusive

| Capacity        | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 |
|-----------------|------|------|------|------|------|------|------|
| 1500 lb.        | 1318 | 1179 | 1200 | 1447 | 1490 | 1560 | 1279 |
| 1-ton           | 1599 | 1506 | 1512 | 1801 | 1879 | 1697 | 1309 |
| 1 1/4-ton       | 1760 | 1472 | 2043 | 1880 | 1958 | 1900 | 1601 |
| 1 1/2-ton       | 1881 | 1911 | 2160 | 2238 | 2256 | 2389 | 2282 |
| 2-ton           | 2272 | 2300 | 2490 | 2908 | 2822 | 2851 | 2521 |
| 2 1/2-ton       | 2481 | 2512 | 2867 | 3222 | 3054 | 3266 | 3066 |
| 3-ton           | 2976 | 3099 | 3332 | 3954 | 3748 | 3705 | 3431 |
| 3 1/2-ton       | 3009 | 3270 | 3486 | 4123 | 4144 | 4132 | 3766 |
| 4-ton           | 3492 | 3466 | 4069 | 4328 | 4399 | 4358 | 4243 |
| 5-ton           | 4158 | 4170 | 4579 | 4871 | 5077 | 4793 | 4638 |
| 5 1/2-ton, etc. | 4740 | 4475 | 5140 | 5664 | 6626 | 5786 | 4910 |

#### High and Low Peaks in Prices, Averages

|                 | Low   | Year | High  | Year | 1922  |
|-----------------|-------|------|-------|------|-------|
| 1000 lb.        | \$689 | 1916 | \$970 | 1921 | \$970 |
| 1500 lb.        | 1179  | 1917 | 1560  | 1921 | 1279  |
| 1-ton           | 1309  | 1922 | 1879  | 1920 | 1309  |
| 1 1/4-ton       | 1472  | 1917 | 2042  | 1918 | 1601  |
| 1 1/2-ton       | 1881  | 1916 | 2389  | 1921 | 2282  |
| 2-ton           | 2272  | 1916 | 2851  | 1921 | 2521  |
| 2 1/2-ton       | 2481  | 1916 | 3266  | 1921 | 3066  |
| 3-ton           | 2976  | 1916 | 3954  | 1919 | 3431  |
| 3 1/2-ton       | 3009  | 1916 | 4144  | 1920 | 3766  |
| 4-ton           | 3466  | 1917 | 4399  | 1920 | 4243  |
| 5-ton           | 4158  | 1916 | 5077  | 1920 | 4638  |
| 5 1/2-ton, etc. | 4749  | 1916 | 6626  | 1920 | 4910  |

price was reduced \$12, but last year it was cut \$366.

The curve of the 5-ton shows a steady increase from 1916 to 1921, when a cut of \$284 was made. Last year a further reduction of \$155 was noticed. As in 1921 the makers of the 5½ to 7½-ton made a large reduction. The average list of these models was reduced \$676 in 1922.

The four models which showed an average advance of \$111 in 1921 over the preceding year's prices are the 1500 lb., 1 ¼, 2 and 2 ½-tons. During 1922 they have decreased in price at an average of \$254. The decrease in these four capacities may be ascribed to the factor of de-

mand and decreased costs of units brought about by a greater production on the part of the unit makers.

#### Has the Bottom Been Reached?

It is apparent that at least the 1916 low peak has not yet been reached, for the accompanying tables will show that only the 1500 lb., 1 and 1½-ton average prices are equal to or less than those which prevailed in 1916. A study of the prices

of 1916 and 1922 will show that with the exception of the 1500 lb., 1 and 1½-ton, the balance of the models have average prices which exceed those of 1916 from \$300 to approximately \$800.

The lower prices of the smaller capacity models probably have been brought about by greater production and the makers working off their post war inventories. While no figures are available as to the inventories of the other classes it is be-

lieved that some at least have not fabricated all material contracted for in the time of the boom and, consequently, at high level prices. If this assumption be correct, then any marked decreases may not be expected until liquidation is complete. On the other hand, one prominent truck manufacturer has raised prices, and it would not be surprising if a few more concerns increase their list prices.

## Service is No Longer an Abstract Term

### 1923 Will Reveal a Fuller Understanding of the Term Service. The Greater Interest Displayed by Factories, Dealers, etc., in Local Service Stations Portends Healthier Service for the Coming Year

**H**AVE we really made progress in service during the past year, and, if so, to what extent? Again, what may be expected in 1923? In answer to the first question it can be stated that more was accomplished in 1922 than is generally realized. A general review of the better-service activities during the past year will convince even the most skeptic. The writer in the December issue of the COMMERCIAL CAR JOURNAL pointed out how and why service propaganda was inceptioned by the service managers of the New York truck and passenger car dealers and distributors. After this initial move the National Automobile Chamber of Commerce entered the field. The N. A. C. C. organized the factory service managers and promoted conventions. About the same time the Society of Automotive Engineers started to hold service meetings.

In addition to the following three fundamental factors in service production, factory service and the dealer service, there is another, the dealer or trade organization. It can be said that progress has been made here, for the number of local service associations has increased to about 25. Some of these are branches of the dealer trade association. The outstanding feature of these organizations was their official recognition and endorsement by the factory service association and the pledging of support. This was one of the big accomplishments of the past year.

#### Unified Opinion Points to Progress

Progress has been made by the engineering or production branch of the industry and those readers who did not, should read the engineering angle of service presented in the paper of B. B. Bachman, president of the S. A. E., and published in the December issue of the COMMERCIAL CAR JOURNAL. He brought out a very important point when he said that the lack of unified opinion in service was one reason why real progress had not been made. Practical means of keeping the cost of operation down to reasonable figures is possible only through the discussion of the service problem from all

its angles by the various factors, sales, production, engineering and service departments. Mr. Bachman emphasized the need of a co-operative experience exchange.

These thoughts are presented to show that progress was made in 1922. Instead of individual effort by only one factor in service there has come about a recognition and co-ordination by all the factors, and on a broader basis. From the exchange of experience and ideas there can be but one result in the future and that will be the development of a service policy that will meet the requirements of the owner and correct methods in merchandising service and keeping it sold. This may be expected in 1923.

#### Flat Rate and Piecework Eventually

The coming year should see in the truck industry a greater development of flat rate and piecework in service. The passenger car industry has made great strides in this respect not only on the part of the dealer, but by the independent service station and garage as well. Truck service stations have been slow to take up this movement but the truck dealer will eventually be compelled to adopt it or some similar method.

Flat rate service in lubrication, a development of last year, will make great strides in 1923. A few truck service stations are supplying the flat rate lubrication service, a concrete case being pointed out in the December issue of this publication. Aside from the profit possible in a lubrication service, which may be given with piecework to provide an incentive to the workman, the plan ties up with inspection as well as affords the station rendering this service a golden opportunity to merchandise service. The plan is highly acceptable to the truck owner, for it brings about an educational contact with the service station. Hence, if the service is properly sold it paves the way for the introduction of the flat rate and, eventually, the piecework plan. In this connection it might be well to emphasize the point that the greatest need in service is to convince the truck owner that good

service decreases operation and maintenance costs.

Another development to be expected in 1923 will be the realization on the part of the truck dealer that in overlooking the merchandising and servicing of truck equipment and supplies, he has failed to grasp an opportunity to increase his profits. The passenger car dealers are intensively merchandising equipment, for it ties up with service and yields profits. But without facilities to service and to install the equipment, real progress cannot be made. The passenger car dealer realizes this, and flat rate and piecework methods are employed in the equipment merchandising campaigns. Eventually the truck dealer will become an active party to the campaign of the Automotive Equipment Association and will "Ask Their Customers to Buy." The writer hazards the prediction that if the truck dealer's service department does not take advantage of the opportunity presented he may find this profitable field exploited by the independent truck service station and, possibly, by some passenger car dealers who handle a line of trucks.

#### Dealers Must Give Support

Now that the dealer or trade associations and factories are displaying greater interest in promoting local service associations, more will be established in the various cities throughout the country. It is expected that steps will be taken to properly sell the trade associations on the value of the local organization, and in this respect the factories and service department of the N. A. C. C. should function. The failure of the dealers to give at least their moral support to the local association movement has been largely due to their not understanding the motives or aims of the organizations. In summing up, 1923 will see a greater advance made in the exploitation of service, for as previously pointed out, there is a more unified service opinion. With the engineer, factory, dealer and service managers co-ordinating there can be but one result, service that will satisfy the owner and produce profits for factory and dealer.

# Overhead and What It Means

**Is It the Cost of Doing Business or is It the Cost of Not Doing Business?**



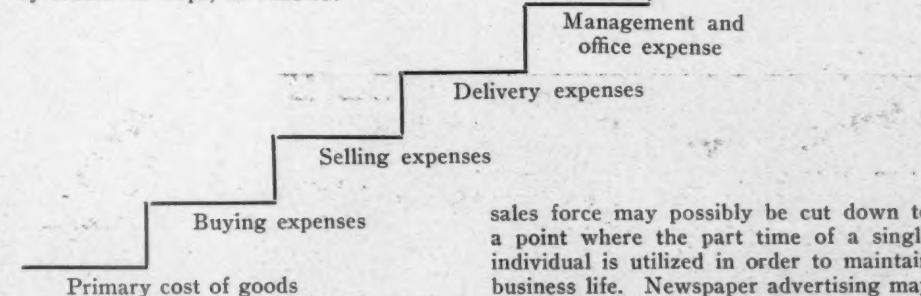
By M. L. SEIDMAN, of Seidman & Seidman, Certified Public Accountants, New York City

OVERHEAD has been the business man's after war bugbear. It has been discussed, feared, molested and operated upon. Its reduction has been held out as the only possible means of retaining the life of a business in the light of post-war conditions. It has been the many-legged monster of the merchant and has probably been the cause of more loss of sleep in the last two years than any other element in business. Yet, peculiar as it may seem, there are very few indeed that have ever stopped to think about just where "overhead" begins and ends. I have seen any number of splendid articles on the analysis of business expenses, on their classification and their treatment in accounts. Minute lines of demarcation have been drawn between one kind of an expense and another. The business man has been shown just what is and what is not cost of his goods. But it is surprising how little light can be obtained on the generally discussed and misunderstood term "overhead."

Overhead has been usually referred to in the books as the "cost of doing business." Yet, if one stops to think a moment, it will be found that the average business man looks upon overhead as the cost of not doing business. One constantly hears of the necessity of doing business in order to cover a certain "overhead." The very word conveys the thought of something hanging over the head of a business, independent of the volume of business done. It is that thought which I believe the average man has as his conception of "overhead." For, in any business there is a certain amount and class of expenses that cannot be dis-

pensed with if the business is to continue to operate. In that case overhead expenses consist of all expenses which are not directly chargeable either to the customer or to particular sales.

The goal of business is profit. In order to arrive at profit, it is first necessary to make two distinct outlays—first the cost of goods, and second, the cost of conducting business. The true cost of goods includes not only the purchase price but all expenses of transportation, drayage, etc., necessary to bring the goods to a salable and deliverable condition. Then come the costs of doing business—selling and delivery expenses, administration expenses, fixed charges, etc. I have always liked to picture the road to profit by means of steps, as follows:



It is the steps between the Primary Cost of the goods and the top step of Profit that is quite generally referred to as the cost of doing business. Overhead lies somewhere between those two points but may be a small part only of the total cost of doing business. Buying expenses which usually consist of salaries and wages of buyers, traveling and other ex-

penses, may be increased or decreased in proportion to volume of business. Selling expenses may include such items as salaries of sales force, premiums, commissions, etc. It may also include advertising of various kinds.

A number of these elements will be readily seen to vary in proportion to the volume of business. Commissions to salesmen may disappear entirely, salaries of

sales force may possibly be cut down to a point where the part time of a single individual is utilized in order to maintain business life. Newspaper advertising may increase or decrease, depending upon the policy of the merchant under a given set of conditions.

Management and Office Expenses consisting usually as they do, of salaries of management, bookkeepers, stenographers, etc., may vary materially in proportion to volume of business.

Fixed Charges and Upkeep such as rent, light and power, insurances, depreciation

and the like, on the other hand may be almost constant under all circumstances. Yet it could not be said that it is only this group of Expenses that represents the overhead of a business, merely because it consists of items that are little affected by business volume, for even these would change to some degree at least in proportion to business done.

"Overhead" to the going business therefore, is that amount of daily expense that would continue even if sales were suddenly stopped or were very materially and radically decreased.

When the falling off in business is considered to be only a temporary affair not justifying the application of a "knife" to-

wards its reduction, the overhead might be permitted to continue almost to the full extent. To reduce overhead, however, and still continue to do business and maintain an organization capable of performing efficiently upon the return of business volume, there must be a boiling down of each element of expense to such a point where the management considers it safe for prevalent conditions, but not overlooking the possibility of early improvement.

It will be seen therefore that overhead is a "pretty slippery sort of an animal," and in trying to get at its beginning and its ending, one would almost conclude that it has neither if applied generally.

Yet if applied to a specific business, it certainly represents a definite burden hanging over that business which must be covered by a specific volume of sales before profits can even be thought of. It is the "skeleton" of operating expenses, and I suppose that when one says that he has cut his expenses to the bone, he really means that he has reached that skeleton.

Success is the reward belonging to that group of business men that have learned to cut close to the bone and yet leave enough recuperating ability for the overhead skeleton to take on plenty of flesh in the shortest possible time, if conditions require it.

## Speed Wagon Used to Pull London Caterer's Trailer

FROM London, England, comes the description of a most unusual and complete equipment which is replacing the time-honored "coffee-stall," an institution that is rapidly passing out of existence. The equipment consists of a caterer's trailer using the Reo Speed Wagon as its tractor-tender.

The introduction of motorized transportation and its development have revolutionized the English "coffee-stall." It now goes far afield; it is taken to the races, sports gatherings, garden fêtes and boat races and resembles in a general way the American lunch wagon.

Outdoor catering in England is a great gamble with the unreliability of the weather and the uncertainty of attendance of the buying public so that speed in the "coffee-stall" is decidedly useful in enabling the vehicle to be run back to its base of supplies and return should the circumstances warrant.

The Speed Wagon is being used advantageously as a power unit for the English "coffee-stall" and enables the owner to quickly transport his lunch wagon wherever he desires and at the same time utilize the truck to bring fresh supplies if required.

By separating the power unit from the wagon, the trailer can then be constructed in such a way as to give more

working room and to have a much lower floor and counter and more headroom, each one of which is a distinct advantage.

A typical trailer of this type has an over-all length of 15 ft. and its body dimensions are 12 ft. by 5 ft. 6 in.

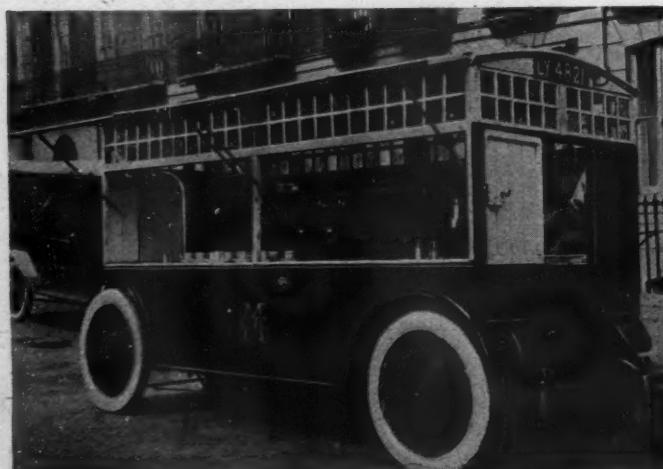
Its counter is 3 ft. 6 in. from the ground and the headroom for the counter hands is 6 ft. 7 in., so that there are no restrictions anywhere. In fact, three counter hands can easily attend to customers, and a very large number of meals can be served.

The body is built of metal panels on an ash frame, with mullion lights all round the frieze. There are two large flaps which act as shelters to customers standing at the counter, and close the vehicle

when it is out of use. A divided door at the rear end permits an extra small serving counter to be put into service, and in the latest vehicle to be built there is also a serving window at the off side.

The interior is fitted with an oil stove at the forward end, screened off with aluminum sheet, and below the counter on the one side and below the shelves on the other are washing places and cupboards with sliding doors for food, stores, crockery, etc. Three large shelves, fitted with glass slide fronts, hold the sandwiches, cakes and other foodstuffs, dainties being displayed in narrow trays, each of which have a place. Cups hang on hooks, and bottles of Oxo and mineral waters are also set out, while on the counter is a large glass "barrel" of lemonade. The interior is lighted with incandescent petrol gas mantles, or with electric lamps fed from the storage batteries. Provision is made for 20 gal. of water. The interior is enamelled white.

A Novel Use to Which a Trailer Has Been Put by a London Caterer. The Interior Dimensions Are 12 ft. by 5 ft. 6 in.



# Borrowed Money to Buy His First Demonstrator

**But This Dealer Had Nerve and Vision. Took Up Electric Trucks Against Everybody's Advice and Sold 87 the First Year by Interesting Sales Methods**

By C. P. SHATTUCK

**T**HIS is a story of an ex-officer, who, upon returning to this country after the war went through the usual experiences of those who sought to re-enter the automobile industry. After engaging in several lines he turned his attention to motor highway transportation and became interested in the possibilities of the electric truck. Now this man, Andrew C. Duncan, has made a success in this field and his experiences and methods of selling, are very interesting. In describing these he said:

"I talked with several friends regarding electric trucks and they strongly urged me to forget them. I called on some concerns to see what they thought of them to obtain some idea of the possible market here. No one had much use for the electric truck or believed they could use them except two or three concerns which had them. Several prominent business men assured me that the electric truck was a dead issue. I was surprised to learn that quite a number of concerns who had electrics about 10 years before, had discarded them one by one after buying several sets of batteries.

#### Borrows to Buy Demonstrator

"To make a long story short, I decided to go into the electric truck business against the advice of my friends. The long period of depression had just about wiped out my capital and I smile now to think of how I had the nerve to tackle a line that was supposed to be dead and said to be hard to sell. I wrote a manufacturer and was advised they had an arrangement in my city. After repeated efforts the agent assisted me in securing the local agency as he preferred selling in another city. I met the manufacturer who was so conservative that I began to think I had made an error, that I would be wiped out before I secured an order. But I signed the contract to buy a demonstrator and to sell 10 trucks the first year. I borrowed the money to buy the demonstrator.

"Next, I read every piece of literature I could find on electrics, asked many questions, studied the proposition from every angle and then went out to get the first order. Knowing that the maker had made his greatest sales in the baking industry, I accordingly selected the largest local bakery and formed my selling cam-

paign. Called and introduced the subject of transportation. The prospect said he had heard that electrics were giving satisfaction in some places but that a man qualified to know said that they were not as economical as horses, which they placed first in economy with electrics second.

#### Sales Resistance Looms on Horizon

"I assured them that electrics were first but they brought up their experiences some 12 years ago. Said they had bought three or four sets of batteries for every truck and that each set lasted from eight to twelve months. They said this expense cured them of electrics so they got rid of them. I explained the difference between the electrics of those days and the present, going over the constructional details. Showed photos, etc. of the new batteries and explained the guarantees and service, as well as the low cost. Then I showed him photographs of many large fleets in service, asking if he was acquainted with any of these concerns. He named one and mentioned the man he knew. He said that the delivery problems of this concern were similar to his

so I got in touch with this man. He wired me to come to St. Louis for a bakers' convention and that he would spend a day with me. He was sold on the electrics and said so. On my return I asked my local prospect to allow me to make an analysis of his entire delivery system and got his permission. I took a demonstrator and rented a motor generator and set it up in the bakery. Took a body off a discarded truck and mounted it on my chassis.

"None of the drivers would try out the truck, all declaring in favor of the horses, so I ran the truck. The first route was the longest and the driver was not pleased to accompany me. We hadn't completed but half of the route when he asked me to stop for a while, because he was away ahead of his schedule. We got back to the bakery an hour earlier and used this time on the second trip. That driver was sure a surprised man and told all the other drivers which resulted in all wanting to try out the electric on their routes. This was done and 35 routes were traveled.

"The saving was from two to three hours on each. On one, a run of about six miles before the first stop was made, I was told that the horses got tired before the work of delivering was started. On this route we saved an hour. The horses were fed at noon, and considering this feeding time we saved four hours on this particular route. In other words we completed the trip and were back at 11 a. m. where with horses he was back at 3 p. m.

#### Drivers Become Salesmen

"I sold the drivers while running the routes and each became a salesman for me. Often the manager of the bakery would come down and ask the drivers how they liked the trucks with the usual reply they wanted them. This is an important factor in sales, i.e., getting the driver on your side and it can be done. I kept records or made an analysis, involving mileage, trips, road and grade conditions, time of departure and return, number of hours saved, etc. This data was presented in a cost and delivery analysis form.

"I was able to obtain cost figures of the horse equipment and with this was able to show what the saving would be with electrics. Without giving figures I will say it was large enough to justify



Andrew C. Duncan  
Has achieved success in merchandising  
electric truck transportation

them in contracting for 40 electric trucks. After one year of service this concern advises me that it is costing them 10 cents less per mile than it did with horses.

"After it became known that one of the largest bakeries had bought electrics and discarded their horses, several others became interested and after going over the proposition carefully with them I was allowed to make a delivery and cost analysis for these. I ran several interesting demonstrations and compiled an analysis, proving I could run their routes and save from 20 to 35 per cent over their delivery system. So I got the business.

"This is the way I had handled my sales thus far and this is what I expect to do in the future. Naturally it is not easy to get a concern to consent to a delivery analysis and it is still harder to get them to show their delivery costs, but if they will do this, two-thirds of the battle is won. If they will not give me their cost figures I always tell them I can estimate them close enough after I find how many horses they are using per route or how many other types of delivery units they employ.

#### Value of Contact Demonstrated

"In making a sale I always try to work the prospect up to a delivery analysis. This places me next to my prospect and as I am there day after day running his routes I get better acquainted with him and numerous chances to talk to him. He becomes interested in the trucks, in the time I save him, his men begin to ask for electrics and I meet him outside the office where it is not so hard to break down the high wall of resistance that a prospect usually throws around himself when seated in a swivel chair.

"One thing that has helped me is my implicit faith in my product for short haul, frequent stop work. I learned my lesson and went out to teach the others the gospel of economy. I know how to figure what it costs to operate the trucks I represent. I do not make a slip shod or superficial analysis. The maker of my truck guarantees its performance, but if they do not know what work the vehicle is to perform how can they guarantee it? For this reason I always insist on a complete analysis.

"Many are interested to know what I will do in taking used trucks. I always tell the prospect that they can sell their trucks or horses for as much as I could and that I can show them positively that even if they were not able to get a red cent they would still be ahead in the long run if they purchase my products. This usually ends the talk although, of course, some hold off because they hate to part with their equipment at a loss.

#### Meeting Objections and How

"The arguments I meet against the electrics are:

1. Not fast enough to replace gasoline trucks.
2. They will not go far enough on a charge.
3. Batteries give lots of trouble.
4. Charging is a lot of trouble, necessitating the employment of a high-priced electrician.

5. Their economy is not sufficient to justify the large investment.

"I answer these briefly as follows:

1. I always answer that a test of the machine under actual conditions will prove whether or not this is true. In every case where the prospect has brought up this objection I have been able to show him that I can run his route with an electric in approximately the same time as with his gasoline car.

2. "I always answer this by stating my demonstrator will go about 75 miles on a charge. To date I have run about 159 routes for various concerns in analyzing their systems and I find the great majority of the routes are under 50 miles. I believe I am safe in asserting that from 75 to 80 per cent are under 50 miles.

Many concerns often run trucks without a speedometer or odometer and simply guess at their mileages. The man-

average man can handle charging work with a little instruction. I can prove many cases where employees of the pension age have taken over the charging and without any trouble.

#### Convincing Evidence at Hand

5. "The electric is sold principally because of its economy. I am always able to show the prospect where he can save at least 20 per cent and frequently more. It all depends upon the economy with which the prospect is operating his present system.

"When making a long route analysis I generally take along a motor generator set and install it in the prospect's garage or stable and get one of the stable hands to operate it. This shows them how simple it is. The bodies I sell are made here and I generally interest myself in helping design them. I also try to work



Show and Salesman of the Andrew C. Duncan, St. Louis, Mo., Distributors of Ward Electric Trucks

The arrow indicates the place on the window where lettering states that the company is composed of "transportation engineers." This company claims that transportation problems are not solved by price deals

ger of one laundry told me the route I was to run was 50 miles, stating that his driver had said so. The oil and gas used was figured as small on the basis of 50 miles, but when it was proved the mileage was 32 the economy was not so apparent. This goes to show that guess-work is employed as a basis of computation. The average driver guesses on the long side.

#### Routing the Battery Bugaboo

3. "When they bring up this objection I usually ask them to write some of the owners of the truck I sell and secure their opinion on this subject. I also show letters from users on the subject. Also show the 10-year battery guarantee, and try to have the prospect talk with some truck users in my city.

4. "When this objection is brought up, I always advise them not to secure a second Thomas Edison, but use one of their handy men around the place. The

out the best method of garaging the trucks in present quarters. For concerns who do not know what their costs are, or who are not in the habit of keeping costs, I make up a cost analysis sheet and supply these sheets. After these are kept for a given period I have an idea of what their costs are. Some of the concerns to whom have been supplied these cost sheets are employing them regularly.

#### Sold 87 in One Year

"This is an outline of what I have done, but not wishing to mislead anyone will say that during the year I have represented the Ward Motor Vehicle Company, I have sold 87 trucks, this number being divided between five concerns and replacing 171 horses and 22 gas trucks.

"My prospects for the future seem very bright indeed because I believe with this number of trucks operating economically and satisfactorily that I have made a number of friends who are glad to speak a good word for my product."

# New York Shows Presage Good Year for the Automotive Industry

THE 1923 Automobile Show at New York will undoubtedly be recorded in the archives of motordom as "bigger and better than ever." Record breaking crowds attended every day and an optimistic spirit prevailed which indicated without a shadow of a doubt that the great American public is more interested in cars than ever before.

Parts and equipment manufacturers who also build units for the truck industry had prominent exhibits at the Palace Show, especially the engine and axle builders who displayed such of their products which were especially designed for motor bus construction.

A noticeable feature of the big show was the greater number of exhibits which featured service equipment, machine tools and all such appliances having to do with the servicing of cars and trucks.

Among the independent displays of automotive products was that which was termed "the overflow show" at the Madison Square Garden. While the majority of the exhibitors were in the accessory field two taxicab companies had exhibits.

Among the accessory exhibits was that of the Shakeproof Screw & Nut Lock Company, Chicago, which concern manufactures a light, strong lock washer of

a patent design which obtains equal pressure at all points. It is rust proof and among other features is adaptable to locking nuts on short threaded bolts. Another feature of the Shakeproof lock washer is that it is not affected by vibratory stresses.

What was perhaps the most interesting and instructive exhibit was that by Ralph C. Rognon & Company, which concern operates a highly specialized service station in New York City. In this space was operated service station equipment which conserves time and labor. This proved a strong drawing card to those interested in service as well as owners of trucks and passenger cars. This company services about 30 different makes and many models on a flat rate basis, sells its service on a maintenance contract and includes a lubrication service. The company also specializes in rebuilding on a flat rate basis.

Among the equipment displays was a new type of spring wheel, the principle of which is a series of coil springs radiating practically from the hub to the felloe and including a conventional shape of pneumatic tire with a gas-filled rubber core. Use is made of a restricted size of inner tube of heavy walls inflated to 75 lbs. pressure.

A new design in a tire chain was shown by the Staggers Auto Safety Chain Co., Fairmont, W. Va. The feature of this construction is the use of drop forged steel I-plates spaced equidistant so that the tread of the tire does not contact with the ground. These plates are carried by the cross links of a conventional chain. The usual side chains are used. A number of Ford devices were displayed. Among these was the Windsor Engine Support and Stabilizer, made by the Windsor Motor Stabilizer Corp., New York City. It is a steel stamping four in. wide which hooks over the engine arms, supporting the crankcase.

The Able Lock Mfg. Company, New York City, showed the new Able steering wheel lock, which can be installed without cutting, drilling, filing, etc. Among other things shown was the Yellow Jack-It jack made in models for both passenger cars and trucks, by the company of the same name and located in Chicago. The Dautrick-Johnson Mfg. Company, Detroit, demonstrated a new form of garage door, known as the Overhead, which, as the name implies, disappears in the top of the structure, operating on a steel track. The design conserves space and is entirely automatic in its action and locks automatically when lowered. One



The Body Builders' Show Held During New York Show Week

of the features of the show were the exhibits of electrically operated and lighted traffic signals in the aisles.

#### The Body Builders' Show

With all space utilized and a wide variety of manufacturers represented the Second National Automobile Body Builders' Show, held at the 12th Regiment Armory, New York City, during the week of the national automobile show, was quite successful. Held under the auspices of the Automobile Body Builders' Association, the exhibits included not only bodies but all material entering into their construction as well as finish.

The show was disappointing to some in that more truck bodies were not exhibited. The few shown were bus types. FitzGibbon & Crisp, Inc., Trenton, N. J., showed a Greeley Sight-Seeing bus body in white and mounted on a Maccar chassis. Whitfield & Son, Pen Yan, N. Y., displayed what was designated as a speed bus body on a Larrabee-Deyo chassis. A feature of the body design was the use of Du Pont Fabrikoid, craftsman quality, for the finish outside and inside. The color was a very dark blue and presented a very striking appearance.

The American Motor Truck Company, Newark, O., showed a complete 30-passenger bus, also an Ace chassis. Both are described elsewhere in this issue. This concern operated a bus to and from the Grand Central Palace and the Armory. A feature of the Ace chassis was the utilization of circular red and white placards featuring each mechanical feature and a red ribbon from each sign to the part or unit.

The exhibits of body hardware were very complete, as were paints, varnish and the products and processes for the preparation of the surfaces. The American Metal Paint Company, Philadelphia, had a very interesting display in this connection, showing its products for the removal and prevention of rust.

The Black & Decker Manufacturing Company, Baltimore, Md., had a very attractive exhibit, showing a complete line of electric drills, portable, etc., valve grinders screw drivers, etc. The exhibit included a body frame on which the Black & Decker electric drills and screw drivers were demonstrated.

Among the other manufacturers and their products were the Carr Fastener Company, Boston, curtain fasteners and

the Dot high pressure lubricator which is standard equipment on a number of trucks; Valentine Company, New York, varnishes and colors; A. S. Campbell Co., Boston, dome lights and windows; Doehler Die Casting Company, Brooklyn, N. Y., die castings in aluminum, tin, zinc, lead alloys and brass castings; Hale & Kilborn Corp., Philadelphia, bus seats; D'Arcy Spring Company, Kalamazoo, cushion springs; Haskelite Manufacturing Corp., Chicago, plywood and metal covered plywood panels and instrument boards. This company demonstrated the resistance to shearing stresses of its Plymeth product. Soss Manufacturing Co., Brooklyn, Soss hinges and body hardware and the United States Electrical Tool Company, Cincinnati, electric portable drills, valve grinders, etc., and N. A. Petry Co., Inc., Philadelphia. The last named displayed a new bus heating system which utilizes the heat of the exhaust gases in a very effective manner and which may be easily controlled. This company distributed a well gotten up circular which describes the installation of its heater in detail, showing layouts for various chassis and seating arrangements.

## Boosters' Club Planning for Summer Meeting of the A. E. A.

Those Attending the Sessions Will Discover the Meaning of New England Hospitality

WHEN the Automotive Equipment Association voted to hold its mid-summer meeting at The Balsams, Dixville Notch, N. H., the members of the association considered that tribute had been paid to New England and now the New England members, jobbers and the Boosters' Club, N. E. No. 1, which organization is to share in the honors, have begun the work to show the A. E. A. members and equipment industry that the "Down East Yankee," is a real live, hospitable human being. It is further proposed to so welcome and entertain the visitors that the pleasant memories will permanently endure.

And to discuss and prepare preliminary plans the committee of the New England Division of the A. E. A. called together its members, jobbers, manufacturers and the Boosters at Worcester, Mass., on the evening of December 19. And it was some meeting. It started at six and lasted until 10.30 and was full of pep and enthusiasm. Frank A. Chase, who presided, explained the object of the meeting and described the attractions of The Balsams. Mr. McIntosh, representing the owner of the New Hampshire resort, outlined its attractions and gave assurances that nothing would be left undone to serve the visitors. He said that there would be none of the usual taxes for transportation to and from the station, baggage handling,

use of golf course, trout lakes, etc. He just guaranteed a real time by real people.

A number of subjects were considered and discussed, these including posting the highways from the principal eastern points to The Balsams so that those motoring would have no difficulty in reaching their objective. Several manufacturers are to supply road signs. It is very likely guides will serve visitors from the various starting points. Some form of an insignia will be supplied for attaching to the cars and the jobbers, etc., are to acquaint all service stations, garages, repair shops and filling stations with the plans for extending a hearty welcome and courteous service to the visitors en route. Road maps will be prepared and in various cities through which the motorists will pass, or visit, arrangements will be perfected to take care of reservations, extend golf, country and city club privileges, etc. Even those who desire to camp on the way East and return will be provided with co-operation. Camp sites will be provided at The Balsams if desired.

Frank A. Chase is publishing a two-page brochure called *The New Englander*, devoted to boosting the coming convention, and will welcome suggestions as to how the New Englanders can make their program 100 per cent. Address Box 84, Attleboro, Mass. If you have a good slogan to suggest for the organization in

charge of welcoming and entertaining the A. E. A.'s at Dixville Notch, send it in to Mr. Chase. There is a fine prize for the winning suggestion.

Previous to the meeting the Boosters held their monthly gathering over which president T. F. Wilson presided. Acknowledgement was made of the copies of the CHILTON booklet, "What the Automobile Means to America," which brochures were distributed among the members by President Wilson.

In addition to routine business, which included the election of new members, it was voted unanimously that the organization contribute \$1000 to aid those in charge of welcoming and entertaining the A. E. A.'s at the convention.

The subject of aiding other sections in developing Booster clubs was discussed, and it was shown that several are making progress. The formation of a club at New York by the New England section was voted down but the organizations of clubs by those interested in boosting the industry, as do the Boosters, in various sections, was favored.

The membership in the Boosters, N. E. No. 1, is fast approaching the 100 mark and there is some talk of limiting the membership to this number. The organization has made real progress since its inception and particularly in bringing about a better understanding between the manufacturer and the jobber as well as boosting for the other fellow. The recognition by the A. E. A. at Chicago of the Boosters is gratifying to the members. Among the many things accomplished by the Boosters is the inviting of the jobbers to meetings, held monthly in different cities, contacts which have helped a better understanding of each other's problems.

# The New Ross Cam and Lever Steering Gear

**Variable Pitch Construction Provides Accelerated Action in Turning Corners. Complete Irreversibility Prevents Road Shocks**

**A** BRAND-NEW steering gear which is radically different in principle and design from any other steering gear which has ever been put on the market has been announced by the Ross Gear & Tool Co., of Lafayette, Ind. The new gear employs the cam and lever principle. In its remarkably small size, its simplicity of construction, its powerful leverage, its accelerated action in operation, and its easy steering under all conditions, the manufacturers claim that it will establish a new and higher standard of steering gear efficiency. Though small in size and simple in construction, it offers so powerful a leverage that it gives even greater efficiency than the screw and nut type on which the Ross reputation has been built. The unique feature of accelerated action in operation gives a new conception of the service which a steering gear can render.

#### Cam Has Variable Pitch

The actuating member is a cam, very similar in appearance to a single thread screw of variable pitch, mounted between ball bearings which take both thrust and radial load. The cam is connected by means of a serrated, splined joint with the steering tube, at the upper end of which the steering wheel is attached. When the steering wheel is turned, the cam turns in its bearings. As the cam turns, the diamond stud projection on the inner side of the lever and in contact with the cam, moves up or down, the lever rotating the trunnion shaft, which is pivoted in the sides of the housing.

The lever is a projection from the trunnion shaft. When it rotates, the trunnion shaft and the steering arm at the other end of the shaft rotate and transmit the steering action to the wheels.

As will be noted from the illustration, the cam is machined with a thread of variable pitch. In mid-position, there is very slight pitch and the motion is slow, but as the pitch increases, the motion increases constantly and rapidly toward either extreme. When the car is driven

straight ahead, the low reduction of the gear in mid-position practically eliminates all road shock. When rounding a corner, a very little turn of the wheel is required as the ratio becomes constantly faster, the farther the wheel is turned.

The housing is split longitudinally, being assembled with shims to get the proper adjustment of the diamond stud and cam surface. A similar shim construction is provided for perfect adjustment of the ball bearings.

The steering arm is attached to the outer end of the trunnion shaft by means of a 36-tooth, V-type, serrated, tapered spline.

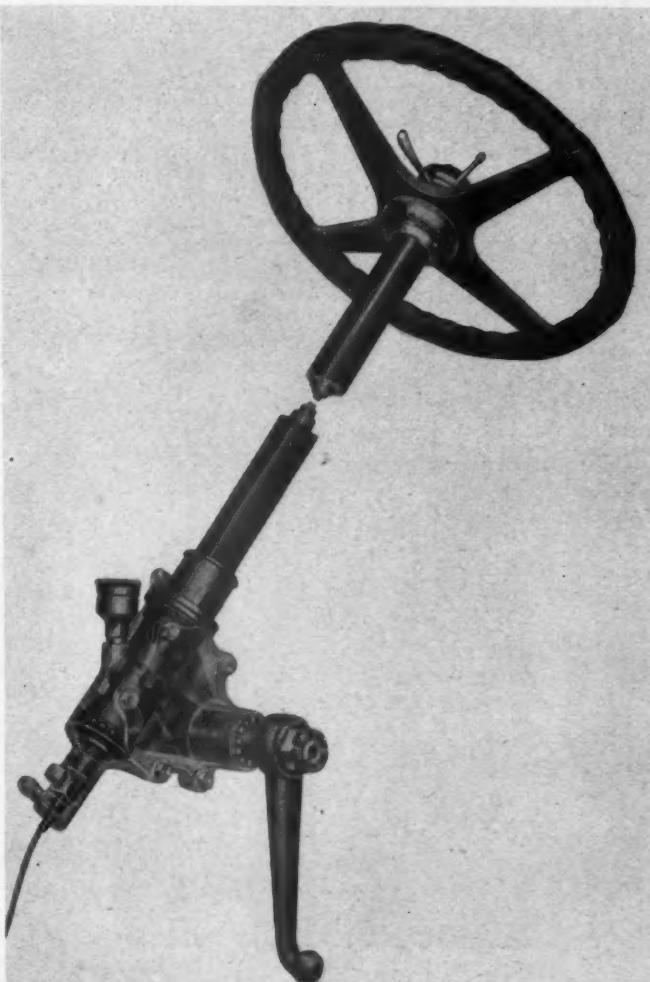
The steering gear is very compact, small and light, exceedingly simple, with very few parts. It is oil-tight and oil-lubricated. Longitudinal grooves on the sector tube and machined in the lower end of the housing, prevent this tube from rotating and hold the upper spark and throttle control set in stationary position when the steering wheel is turned. These grooves also perform another function in preventing the oil from leaking out of the bottom of the steering gear.

The gear is so irreversible that the driver does not have to fight even the roughest road. Practically no road shock is felt in the steering wheel. It has been held by some engineers that if the steering gear operates too easily, the car will not hold to the road well, but this new Ross cam and lever steering gear offers the easiest kind of steering, at the same time assuring positive traction of the front wheels.

The accelerated action in turning corners is a highly desirable feature. This feature will be appreciated by the operator when swinging his vehicle back into flat-to-the-curb parking position.

The steering wheel, spark and throttle control are of the latest and most refined type.

The new Ross cam and lever steering gear will be manufactured in four models—Model C, designed for passenger cars weighing up to 3200 lb. and trucks of not more than  $\frac{3}{4}$  ton; Model E, for passenger cars weighing over 3200 lb. and for 1½-ton trucks; Model G, for 2, 2½ and 3-ton trucks; Model I, for trucks of 3½ tons and over.



Note the Simplicity of the Cam Construction

Without increasing the weight or size of the gear, the lever arm inside the gear is very long, giving remarkably easy steering and long life both to the cam surface and the diamond stud which moves upon it. The longer the arm, the less pressure is exerted on the contact surfaces.

The cam and trunnion shaft are both manufactured from low carbon steel, case hardened. The cam surface and the diamond stud are exceedingly hard and wear-resisting.

# The Rowe-Stuart Fluid Transmission

***A Radical Departure From All Former Attempts of Hydraulic Transmission Construction. Oil is Used as a Static Element and Not as a Mobile Fluid***

PERHAPS no announcement of any new device has created as much interest in the mechanical world as the Rowe-Stuart Fluid Transmission which is owned by, and is now being manufactured by the Rowe-Stuart Motor Corporation, of Lancaster, Pa. Incidentally, this is the initial announcement of this new device in any automotive trade paper.

To begin with, this new transmission is not limited to the automotive field. It is applicable to every form of power drive where a clutch or reduction gear is ordinarily used and which units it displaces entirely.

The Rowe-Stuart Fluid Transmission is the invention of J. E. Farrell, Jr., chief engineer and vice-president of the corporation, and is the result of eleven years of constant experiment and research. This device has been quietly tested in various installations, first as a marine clutch, then on factory line shafts and heavy machinery, then on a combustion-engined trolley car, and finally on passenger cars, trucks and farm tractors.

As a marine clutch it enables the engine to pick up the propeller load gradually, from nothing to full speed; without danger of stalling and without the racking, jerky, engine-destroying start that now prevails. There is no metal to metal contact between the driving member and driven member and no disks to wear out or require relining. As a marine clutch it is not limited as to size. It can be made to develop thousands of horsepower as easily and as efficiently as it does fifty and in the larger sizes an automatic release feature is provided that will save many a propeller or shaft. Many vessels are disabled every week because of breakage of the propeller or shaft through hitting some obstruction.

Assuming that a vessel is equipped with a Rowe-Stuart Fluid Transmission, used as a shaft coupling, the danger of breakage to either shaft or propeller is minimized, because, with the pressure release feature installed, the moment the propeller comes in contact with the obstruction the

load pressure is increased beyond normal and the clutch releases, the propeller stops, drags over the obstruction, and when it reaches clear water again automatically resumes its revolutions.

This feature alone has caused much favorable comment from engineers and one engineer executive in one of the country's largest steel plants predicts that the device will revolutionize the rolling mill equipment of the world.

In airplanes this transmission discloses great advantages. Installed either in the hub of the propeller or between it and the power plant, the device enables the operator to start and control his engine independent of the propeller. It makes the electric starter practical on airplanes; the engine can be operated at its most efficient speed and the propeller, operated independently at any speed desired from nothing to the maximum revolutions of the power plant.

It reduces the hazard of controlling the propeller, as is now the case, with the engine throttle; alternately speeding and slowing down the engine.

Mechanically this transmission is simple and consists of a few moving parts. It is rough and ready and does not require the close machining that is necessary in most mechanical devices.

Eleven moving parts go to make up the two units, driving and driven, which are confined within its cylindrical housing. It is mounted on standard type ball bearings; every part is standardized and with the exception of its main castings, the parts are obtainable from standard parts manufacturers. Every moving part is submerged in oil and there is no mechanical connection between the driving and driven members; the oil itself is the only connecting element.

There are no driving gears or shift levers, the load is picked up gradually from nothing to maximum, approximating the steam or electric car in this respect; and any drive shaft speed from one revolution to the maximum of the power plant is obtained through the simple movement of a foot pedal which replaces the present clutch pedal. The present clutch and transmission are both discarded, as the new single fluid unit provides for both functions.

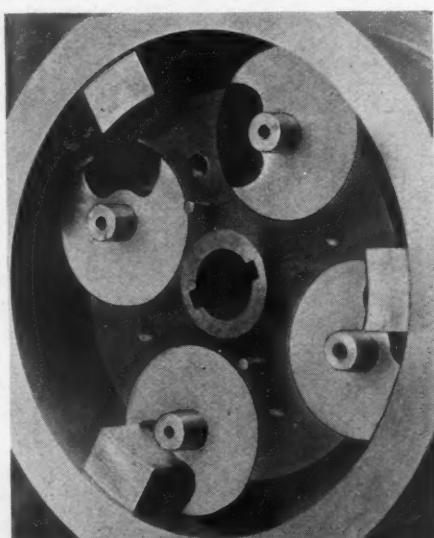
The device follows S. A. E. practice throughout and is interchangeable with present type gear installations in any car so equipped, without changing a single bolt or bolthole for the new installation. For Ford cars the company is developing a special installation.

Thus this device is announced to the automotive trade with the confidence that in its present perfected form it will revolutionize present passenger car, motor truck and tractor design.

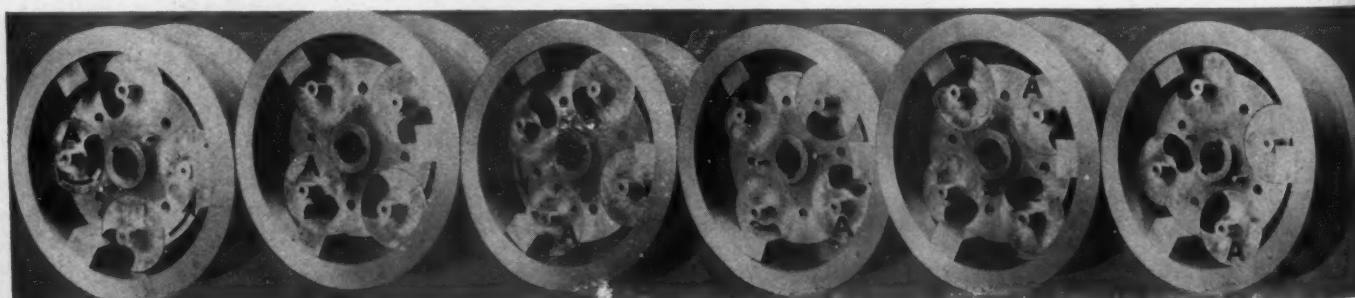
## How It Operates

To describe the principle involved in a few words: The device transmits the power of a driving unit to a driven unit through static fluid. Any good grade of lubricating oil can be used.

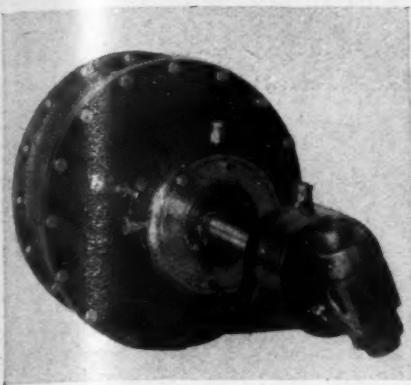
In the idle or neutral position the fluid is solely a part of the drive-shaft member while in the intermediate speeds it pro-



Close-up, Showing Contour of the Rotors



Showing How the Rotors Are Timed to Pass Over the Three Abutments



Drive Shaft End

Shows universal joint and bearing block of drive shaft

gressively becomes part of both until in high, or one to one relation, the device becomes the same as a solid coupling.

The transmission is cylindrical in shape and consists of driving and driven members within the driving member which is directly attached to the engine flywheel, a spool-like driven member is enclosed, floating on bearings and keyed to the power shaft.

Around the periphery of this spool-like driven member, and between it and the outside member, is a circular channel filled with oil, into which the four steel rotors of the driven members project to form a positive block to the passage of oil around the channel, so that the oil must always rotate in unison with the driven member. Attached to the outer, or driving member, and also projecting into the oil channel, are three steel abutments, which may be withdrawn at will by the movement of the power lever.

When in, they likewise form a block to the passage of the oil around the circular channel. A sector is cut out of each rotor, so that they may rotate over the steel blocks or abutment without frictional contact, but so as to maintain an oil seal. The small timing gears assure the proper position of the sector in rotating over the abutment. In operation, the power is transmitted to the abutments from the outer member with which they interlock. From the abutments the power is transmitted to the oil, then through the oil to the rotors, and in turn to the driven, spool-like member and the power shaft. When the abutments are in all the way, the oil, being blocked or trapped by both the abutment blocks and the steel rotors, form a solid coupling.

The abutments regulate the amount of oil that is permitted to pass and thus this transmission provides for any speed desired.

From the foregoing it will be seen that the Rowe-Stuart Fluid Transmission does not bear any relation to the pump-type of hydraulic transmission. The fluid does

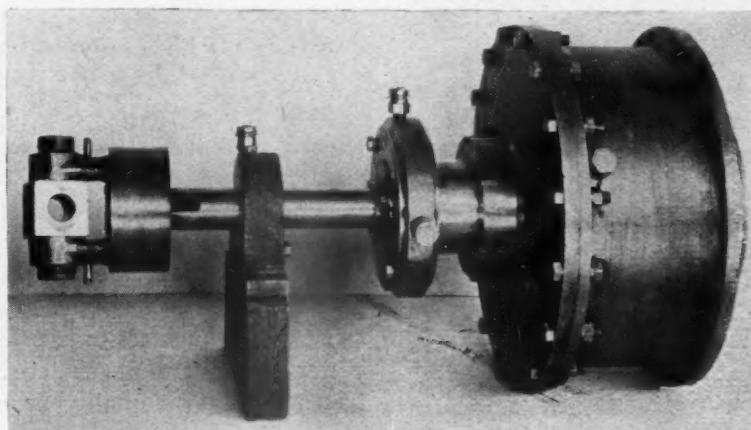
not, mechanically speaking, move at all in relation to the other members.

At one point of operation, the idle motion, the fluid is an integral part of one member; in the intermediate speeds the fluid really takes on two characteristics, each becoming a part of the other two members and rotating at different speeds while in high speed the fluid becomes as one body again, but this time as the solid locking agency between the other two members.

Thus it may be said that there are three members which go to make up the transmission; these are the driving or engine member, the driven, or drive shaft member, and the fluid or coupling member, all contained in a single housing 11½ in. in diameter and 10¼ in. long.

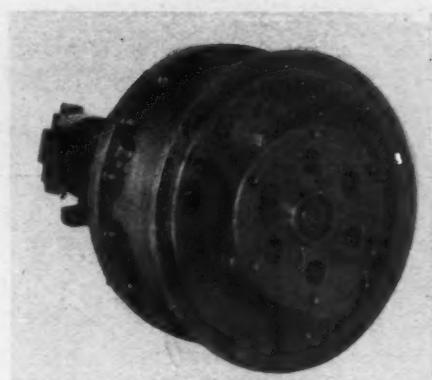
One of the great troubles encountered with hydraulic clutches and transmissions of the pump type has been the excessive heating. In this transmission, after grueling tests, the palm of the hand may be held on the casing without discomfort.

The advantages of this transmission are obvious. It provides simplicity of action;



Side View: Transmission With Flywheel Removed  
Length, 10 in. including throwout collar. Fully extended as in neutral operating position

any speed desired by simply moving a lever forward or back; it eliminates jerks, shocks or strains on engine, chassis or strains on engine, chassis or tires and is noiseless. Some remarkable performance tests have been made with this device which lack of space prevents us from detaining. A very simple reversing device is attached to the driveshaft member, operated by the same foot pedal.



Rear End With Flywheel Removed  
Flywheel forms rear cover for the device. Shows timing gears which time and insure passage of rotors over abutments. These gears carry no load, are only ½ in. face and do not move at all in high position.

#### The Anderson Tire

Besides this, the Rowe-Stuart Motors Corp., also owns the Anderson Pneumatic Cushion tire, which is at present being manufactured at the Anderson Tire plant, located at Anacostia, D. C.

This tire differs from usual cushion tires in that it includes a pneumatic feature produced by the use of air cells, in which air is confined at about thirty pound pressure.

The accompanying illustration tells the story better than words.

The air cells are circumferentially placed around the rim and are moulded in the rubber. Each cell is plugged with a steel cup, which traps the air at about thirty pound pressure. The rubber under road pressure flows inwardly on the air cell, which progressively resists and absorbs the shock with velvet-like cushion effect, saving the chassis, engine, etc., from injury.

So that these products can be placed on a big production basis, the Rowe-Stuart Co. is now building extensive additions to its present plant at Lancaster, to take care of both the new transmission and the Anderson tire on a big production basis.



Illustrating the Shock Absorbing Principle of the Anderson Cushion Tire.



# EDITORIALS



## What Are Its Features?

**I**N reviewing the great amount of literature which passes over the editor's desk, we occasionally come upon a catalog or circular which indicates that real thought and intelligence was employed in preparing the data, illustrative matter and so forth.

But ninety per cent of the mail matter broadcasted by the trade is trite and stereotyped, so to speak. Claims made by one manufacturer are duplicated by a dozen others. No effort is made to show the recipient of the circular why the product in question has a reason for its existence. Claims are made that are absolutely untrue. It is in this respect that a great amount of good can be accomplished by the industry. More data should be given which gives the reader real facts rather than a discussion knocking every other manufacturer's product. If some makers' catalogs would contain less information on the deficiencies of the other maker's products and more about their own product, they would accomplish what they are intended for.

## The Replacement Business

**M**ANY manufacturers of motor truck and passenger car units have come to the conclusion that there is money to be made in the replacement field. In fact, it is considered by many as a phase of the industry which they have neglected—so why not get into it now!

This is indeed a happy thought and we do not wish to discourage any manufacturer who has real reasons for entering this field from doing so. There is undoubtedly a tremendous amount of money spent in replacement parts every year in the automotive industry. Recent figures compiled by the CHILTON Survey Department on the replacements needed in the truck field are really astonishing. It's a division of the industry which is coming to the foreground more and more simply because there are over eleven million trucks and passenger cars in actual use daily in this country. Taken all in all this replacement business is becoming more important to some concerns than their factory equipment business, which means that more concerns may eventually drop the latter and devote their whole time to the manufacture of replacement parts.

All of which is fine and dandy—provided the company which goes into the replacement field has definite plans for distributing its product. In other words it's a cinch for some concerns to go into the replacement field. It may be easy enough for them to utilize their present machinery and equipment to turn out some parts which just fits their factory equipment. And in many instances, this is the principal reason why many concerns are going into the replacement field.

But here's a little note of warning which may be timely. The manufacturer who contemplates going into this field, should first of all have a definite reason for doing so. Simply jumping into the replacement business because it appears like an easy profit-making proposition is not a sufficient reason. Such tactics will lead to nothing else than a price-cutting war. The manufacturer contemplating volume production in the replacement field should first of all make definite plans for distribution. He should also ascertain the number of manufacturers who are already in the field making the same line of replacement parts. Briefly, analyze the field from its every angle. If he expects to get his share of the business on a price basis alone—he had better stay out of it. There's a big difference between building a quality article and one based on price only.

## The Good Roads Show

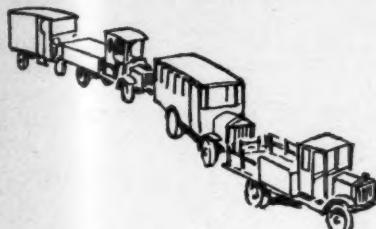
**O**N Monday, January 15th, perhaps the greatest exposition of labor saving machinery, material, methods and appliances was held at Chicago under the auspices of the American Road Builders' Association.

The National Good Roads Show was of particular interest to motor truck manufacturers and dealers because of the fact that many motor truck sales during the coming months will be made to contractors and those engaged in the building of roads.

This year promises to be the greatest year in the era of road building in American history, and from an educational viewpoint, this show was of great value to motor truck manufacturers.

A review of this show will be given in our February number to thoroughly acquaint our readers with the immense progress in road construction in this country.

# Always a Good Dealer Proposition Now ~ Better than Ever



THE Federal distributing organization has always been one of the best, country-wide, and successful.

The Federal Truck has always had the quality that brings repeat orders and builds an enviable reputation.

Financially, the Federal Motor Truck Company is one of the strongest in the industry with the highest rating possible in any business. It has the strength to back up its product and its distributing organization.

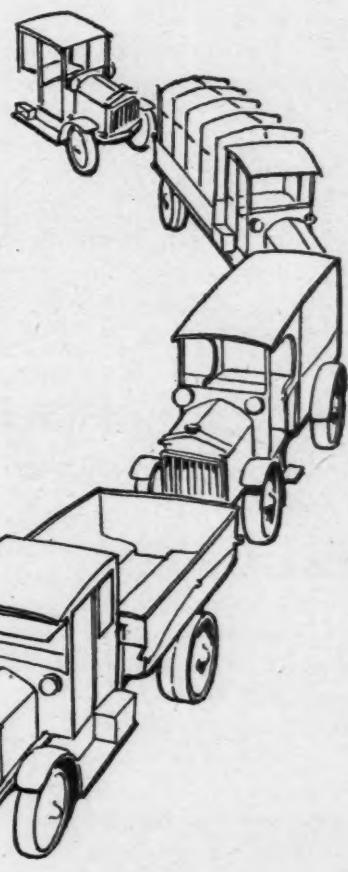
And now entering upon a new era of prosperous truck business, the Federal has the most complete line. In each truck is embodied all the modern practices that 12 years' experience finds sound.

If you become a Federal distributor, you will be in the best company.

## Tie to the **FEDERAL** Line

Fast Express  
1 to 1½ ton  
2 to 2½ ton  
3½ to 4 ton  
Light Duty Tractor  
Heavy Duty Tractor

Federal Motor Truck Co., Detroit



*Another*  
**FEDERAL** Dealer  
is another Successful Truck Merchant

# FACTS and FIGURES of the Automobile Industry for 1922

By ALFRED REEVES, General Manager National Automobile Chamber of Commerce

## Motor Bus and Motor Truck Facts

|   |               |
|---|---------------|
| Number of cities using bus lines ....                         | 108           |
| Number of motor buses in use.....                             | 40,000        |
| Number of schools using motor buses                           | 12,000        |
| Number of street railways using motor buses .....             | 56            |
| Number of railroads using motor vehicles on short lines ..... | 40            |
| Number of motor express lines in U. S.                        | 1,500         |
| Farm products hauled by motor transport annually (tons) ..... | 134,400,000   |
| Freight hauled annually by motor trucks—tons .....            | 1,430,000,000 |

## Motor Vehicle Retail Business in U. S.

|   |        |
|---|--------|
| Passenger car dealers .....             | 38,000 |
| Motor truck dealers .....               | 25,000 |
| Public garages .....                    | 48,000 |
| Service stations and repair shops ..... | 63,000 |
| Supply stores .....                     | 63,700 |

## Production

|  |                 |
|--|-----------------|
| Cars and trucks .....  | 2,527,000       |
| Cars .....   | 2,287,000       |
| Trucks .....   | 240,000         |
| Previous record motor vehicle production (1920) .....              | 2,205,000       |
| Number of new cars needed for replacements in 1923 .....           | 1,800,000       |
| Production of closed cars .....                                    | 35%             |
| Total wholesale value of cars and trucks .....                     | \$1,558,567,000 |
| Total wholesale value of cars....                                  | \$1,374,487,000 |
| Total wholesale value of trucks..                                  | \$184,080,000   |
| Estimated average retail price of car 1921 .....                   | \$900           |
| Estimated average retail price of car 1922 .....                   | \$770           |
| Reduction in average retail price of car .....                     | 14%             |
| Estimated average retail price of truck 1921 .....                 | \$1,325         |
| Estimated average retail price of truck 1922 .....                 | \$1,050         |
| Reduction in average retail price of truck .....                   | 21%             |
| Tire production .....  | 36,340,000      |
| Number of persons employed in motor vehicle and allied lines ..... | 2,431,400       |

## Automobile's Relation to Other Business

|   |               |
|---|---------------|
| Number of carloads of automobile freight shipped by railroad .....  | 400,000       |
| Per cent of rubber supply used by automobile industry .....         | 83%           |
| Per cent of plate glass supply used by automobile industry .....    | 30%           |
| Per cent of aluminum supply used by automobile industry .....       | 20%           |
| Per cent of iron and steel supply used by automobile industry ..... | 4%            |
| Number of doctors using motor cars..                                | 110,000       |
| Number of motor cars owned by corporations .....                    | 600,000       |
| Gasoline consumption (U. S.) 1922 (gal.) .....                      | 5,300,000,000 |
| Average monthly surplus of gasoline (gal.) .....                    | 784,261,000   |
| Gasoline consumption (U. S.) 1921 (gal.) .....                      | 4,506,706,000 |
| Per cent of cars used more or less for business .....               | 90%           |
| Per cent of total car mileage used entirely for business .....      | 60%           |

## Exports

|  |               |
|--|---------------|
| Value of motor vehicles and parts exported (including engines and tires) ..... | \$123,742,000 |
| Number of motor cars exported.....   | 66,000        |
| Number of motor trucks exported...   | 10,000        |
| Value of motor cars exported .....   | \$52,125,000  |
| Value of motor trucks exported.....  | \$8,381,000   |

## Registration

|  |               |
|--|---------------|
| Motor vehicles registered in U. S. (approximate) ..... | 11,500,000    |
| Motor cars .....                                       | 10,250,000    |
| Motor trucks .....                                     | 1,250,000     |
| Increase in U. S. registration over last year .....    | 7%            |
| World registration of motor vehicles .....             | 12,750,000    |
| Per cent of world registration owned by U. S. A. ....  | 81%           |
| Motor vehicle registration on farms..                  | 3,500,000     |
| Motor cars .....                                       | 3,300,000     |
| Motor trucks .....                                     | 200,000       |
| Motor cars serving suburban communities .....          | 780,000       |
| Passengers carried annually by motor car .....         | 7,500,000,000 |

# Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line  
Fan Belt Type: V—V-Shape, F—Flat, R—Round

| Name, Model and Tonnage | ENGINE       |            |                 |                |                        |        |         | BRAKE LINING |       |           |        |        | FRAME     |               |        |       |         |
|-------------------------|--------------|------------|-----------------|----------------|------------------------|--------|---------|--------------|-------|-----------|--------|--------|-----------|---------------|--------|-------|---------|
|                         | Piston Rings | Carburetor | Upper Hose      | Lower Hose     | Fan Belt               |        | Service |              |       | Emergency |        | Length | Width     | Length        | Width  |       |         |
|                         | No. per Cyl. | Width      | Outlet Diameter | Inlet Diameter | Vertical or Horizontal | Length | Width   | Length       | Width | Type      | Length | Width  | Thickness | No. of Pieces | Length | Width |         |
| Acason R-1.             | 4            | 1/4        | 1               |                |                        |        |         |              |       |           | 11 1/2 | 3      | 1/4       | 2             | 11 1/2 | 3     | 1/4     |
| Acason RB-1 1/2         | 4            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 11 1/2 | 3 1/2  | 2         | 11 1/2        | 3 1/2  | 2     | 112     |
| Acason H-2 1/2          | 3            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 13 1/2 | 3 1/2  | 2         | 13 1/2        | 3 1/2  | 2     | 34      |
| Acason L-3 1/2          | 3            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 16     | 3 1/2  | 2         | 16            | 3 1/2  | 2     | 35      |
| Acason M-5              | 3            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 18     | 4 1/2  | 4         | 18            | 4 1/2  | 4     | 35      |
| Ace, Series A-1 1/2     | 3            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 18     | 3 1/2  | 4         | 22 1/2        | 3 1/2  | 2     | 32      |
| Ace, Series A-2 1/2     | 4            | 1/4        | 1 1/2           |                |                        |        |         |              |       |           | 13 1/2 | 2 1/2  | 4         | 14 1/2        | 2 1/2  | 4     | 32      |
| Acme 20-1.              | 3            | 1/4        | 1               | V              | Horizontal             | 11     | 2       | 11           | 2     | 38 1/2    | 12     | 3 1/2  | 4         | 11 1/2        | 2 1/2  | 4     | 34      |
| Acme 30-1 1/2           | 3            | 1/4        | 1               | V              | Vertical               | 8      | 1 1/2   | 11 1/2       | 1 1/2 | 40        | 12     | 3 1/2  | 4         | 11 1/2        | 2 1/2  | 4     | 34      |
| Acme 40-2.              | 4            | 1/4        | 1               | V              | Vertical               | 7      | 1 1/2   | 11           | 1 1/2 | 39 1/2    | 12     | 3 1/2  | 4         | 12            | 3 1/2  | 4     | 34      |
| Acme 40L-2              | 4            | 1/4        | 1 1/2           | V              | Vertical               | 7      | 1 1/2   | 11           | 1 1/2 | 39 1/2    | 13     | 3 1/2  | 4         | 12            | 3 1/2  | 4     | 34      |
| Acme 60-2 1/2           | 4            | 1/4        | 1 1/2           | V              | Vertical               | 10     | 1 1/2   | 11           | 1 1/2 | 41 1/2    | 13     | 3 1/2  | 4         | 13            | 3 1/2  | 4     | 34      |
| Acme 60L-3              | 4            | 1/4        | 1 1/2           | V              | Vertical               | 11 1/2 | 1 1/2   | 11 1/2       | 1 1/2 | 41 1/2    | 13     | 3 1/2  | 4         | 13            | 3 1/2  | 4     | 34      |
| Acme 90-4               | 4            | 1/4        | 1 1/2           | V              | Vertical               | 10     | 1 1/2   | 11           | 1 1/2 | 41 1/2    | 13     | 3 1/2  | 4         | 13            | 3 1/2  | 4     | 34      |
| Acme 90L                | 3            | 1/4        | 1 1/2           | V              | Vertical               | 11     | 2       | 14           | 2     | 40 1/2    | 15 1/2 | 3 1/2  | 4         | 15 1/2        | 3 1/2  | 4     | 37      |
| Acme 125-5              | 3            | 1/4        | 1 1/2           | V              | Vertical               | 11     | 2       | 14           | 2     | 40 1/2    | 15 1/2 | 3 1/2  | 4         | 15 1/2        | 3 1/2  | 4     | 37      |
| Apex GW-1.              | 3            | 1/4        | 1               | V              | Vertical               | 7 1/2  | 2       | 12           | 2     | 36 1/2    | 42     | 2      | 4         | 41 1/2        | 2      | 2     | 35      |
| Apex D-1 1/2            | 3            | 1/4        | 1               | V              | Vertical               | 7 1/2  | 2       | 12           | 2     | 36 1/2    | 42     | 2      | 4         | 41 1/2        | 2      | 2     | 35      |
| Apex E-2 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 7 1/2  | 2       | 12           | 2     | 36 1/2    | 53 1/2 | 2      | 4         | 128           | 2      | 2     | 31 1/2  |
| Apex F-3 1/2            | 3            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 15 1/2       | 2     | 34 1/2    | 24     | 2      | 4         | 41 1/2        | 2      | 2     | 35      |
| Armlader 21-1 1/2       | 4            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 15 1/2       | 2     | 34 1/2    | 11 1/2 | 3 1/2  | 4         | 11 1/2        | 3 1/2  | 4     | 32      |
| Armlader 40B-1 1/2      | 4            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 15 1/2       | 2     | 34 1/2    | 13 1/2 | 3 1/2  | 4         | 13 1/2        | 3 1/2  | 4     | 32      |
| Armlader 40C-1 1/2      | 4            | 1/4        | 1               | V              | Vertical               | 9 1/2  | 1 1/2   | 11 1/2       | 1 1/2 | 33 1/2    | 13 1/2 | 3 1/2  | 4         | 13 1/2        | 3 1/2  | 4     | 32      |
| Armlader KWB-3 1/2      | 4            | 1/4        | 1               | V              | Vertical               | 8 1/2  | 1 1/2   | 11 1/2       | 1 1/2 | 34        | 13 1/2 | 3 1/2  | 4         | 13 1/2        | 3 1/2  | 4     | 36      |
| Armlader KWC-3 1/2      | 4            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 16           | 2     | 35 1/2    | 37     | 3      | 4         | 16            | 3 1/2  | 4     | 36      |
| Armlader HWB-2 1/2      | 4            | 1/4        | 1               | V              | Vertical               | 10     | 1 1/2   | 16           | 1 1/2 | 35 1/2    | 37     | 3      | 4         | 13 1/2        | 3 1/2  | 4     | 32      |
| Armlader HWC-2 1/2      | 3            | 1/4        | 1               | V              | Vertical               | 9 1/2  | 1 1/2   | 16           | 1 1/2 | 33 1/2    | 13 1/2 | 3 1/2  | 4         | 13 1/2        | 3 1/2  | 4     | 32      |
| Atco B-1 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 8 1/2  | 1 1/2   | 11 1/2       | 1 1/2 | 34        | 13 1/2 | 3 1/2  | 4         | 13 1/2        | 3 1/2  | 4     | 32      |
| Atco B-1 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 15 1/2       | 2     | 34 1/2    | 24     | 2      | 4         | 21 1/2        | 2      | 2     | 109 1/2 |
| Atco A-2 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 11     | 2       | 11           | 1 1/2 | 31 1/2    | 46     | 2      | 4         | 21 1/2        | 2      | 2     | 109 1/2 |
| Atlas 22-1.             | 3            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 11           | 1 1/2 | 33 1/2    | 40     | 2      | 4         | 22 1/2        | 2      | 1     | 84 1/2  |
| Atterbury 20R-1 1/2     | 4            | 1/4        | 1               | V              | Vertical               | 8      | 1 1/2   | 14           | 1 1/2 | 38 1/2    | 11 1/2 | 3 1/2  | 4         | 11 1/2        | 3 1/2  | 4     | 34      |
| Atterbury 22C-2 1/2     | 4            | 1/4        | 1               | V              | Vertical               | 10 1/2 | 1 1/2   | 16           | 1 1/2 | 40 1/2    | 11 1/2 | 3 1/2  | 4         | 12 1/2        | 3 1/2  | 4     | 34      |
| Atterbury 22D-3 1/2     | 4            | 1/4        | 1               | V              | Vertical               | 10 1/2 | 1 1/2   | 16           | 1 1/2 | 40 1/2    | 11 1/2 | 3 1/2  | 4         | 12 1/2        | 3 1/2  | 4     | 34      |
| Atterbury 8E-5          | 3            | 1/4        | 1               | V              | Vertical               | 14     | 2       | 20 1/2       | 2     | 40        | 15 1/2 | 3 1/2  | 4         | 15 1/2        | 3 1/2  | 4     | 37 1/2  |
| Autocar XXI-F-1 1/2     | 4            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 5            | 1 1/2 | ...       | 16 1/2 | 2 1/2  | 4         | 13 1/2        | 2 1/2  | 4     | 34      |
| Autocar XXI-G-1 1/2     | 4            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 5            | 1 1/2 | ...       | 16 1/2 | 2 1/2  | 4         | 13 1/2        | 2 1/2  | 4     | 34      |
| Autocar XXVI-3 1/2      | 3            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 3 1/2        | 1 1/2 | 49 1/2    | 25 1/2 | 2 1/2  | 4         | 25 1/2        | 2 1/2  | 4     | 34      |
| Autocar XXVI-5          | 3            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 3 1/2        | 1 1/2 | 49 1/2    | 25 1/2 | 2 1/2  | 4         | 25 1/2        | 2 1/2  | 4     | 34      |
| Autocar XXVII-4         | 3            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 3 1/2        | 1 1/2 | 47 1/2    | 22 1/2 | 2 1/2  | 4         | 22 1/2        | 2 1/2  | 4     | 34      |
| Autocar XXVII-4         | 3            | 1/4        | 1               | V              | Vertical               | 3 1/2  | 1 1/2   | 3 1/2        | 1 1/2 | 47 1/2    | 22 1/2 | 2 1/2  | 4         | 22 1/2        | 2 1/2  | 4     | 34      |
| Available H-1 1/2       | 2            | 1/2        | 1               | V              | Vertical               | 11     | 2       | 14           | 1 1/2 | 40        | 48     | 2 1/2  | 4         | 40            | 2 1/2  | 2     | 32      |
| Available H-2 1/2       | 3            | 1/4        | 1               | V              | Vertical               | 11     | 1 1/2   | 14           | 1 1/2 | 40        | 48     | 2 1/2  | 4         | 40            | 2 1/2  | 2     | 32      |
| Available H3.           | 3            | 1/4        | 1               | V              | Vertical               | 11     | 1 1/2   | 14           | 1 1/2 | 42        | 16     | 3 1/2  | 4         | 16            | 3 1/2  | 2     | 36      |
| Available H5.           | 3            | 1/4        | 1               | V              | Vertical               | 12     | 2       | 16           | 2     | 40        | 18     | 4      | 4         | 18            | 4      | 2     | 38      |
| Available H2 1/2        | 4            | 1/4        | 1               | V              | Vertical               | 12     | 1 1/2   | 14           | 1 1/2 | 40        | 48     | 2 1/2  | 4         | 20            | 2 1/2  | 2     | 32      |
| Available H3 1/2        | 4            | 1/4        | 1               | V              | Vertical               | 12     | 1 1/2   | 14           | 1 1/2 | 40        | 16     | 3 1/2  | 4         | 16            | 3 1/2  | 2     | 36      |
| Available H5.           | 4            | 1/4        | 1               | V              | Vertical               | 10     | 2       | 6 1/2        | 2     | 31 1/2    | 19 1/2 | 2      | 4         | 18 1/2        | 2      | 4     | 38      |
| Avery 1.                | 3            | 1/4        | 1               | V              | Vertical               | 10     | 2       | 10           | 1 1/2 | 32        | 36     | 2      | 4         | 42            | 3      | 1     | 85      |
| Bell M-1.               | 1            | 1          | 1               | V              | Vertical               | 10     | 2       | 10           | 1 1/2 | 32        | 39     | 1 1/2  | 1         | 48            | 3      | 1     | 34      |
| Bell E-1 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 10     | 2       | 10           | 1 1/2 | 32        | 48     | 2 1/2  | 1         | 54            | 3      | 1     | 34      |
| Bell O-2 1/2            | 4            | 1/4        | 1               | V              | Vertical               | 10     | 2       | 10           | 1 1/2 | 32        | 18     | 4      | 4         | 18            | 4      | 1     | 34      |
| Bessemer G-1            | 3            | 1/4        | 1               | V              | Vertical               | 11 1/2 | 2 1/2   | 10           | 2 1/2 | 43        | 46     | 2 1/2  | 2         | 44            | 2 1/2  | 2     | 34      |
| Bessemer H-2-1 1/2      | 3            | 1/4        | 1               | V              | Vertical               | 11 1/2 | 2 1/2   | 10           | 2 1/2 | 43        | 16 1/2 | 2 1/2  | 8         | 16 1/2        | 2 1/2  | 2     | 34      |
| Bessemer JZ-2 1/2       | 3            | 1/4        | 1               | V              | Vertical               | 12     | 1 1/2   | 5            | 1 1/2 | 36 1/2    | 18 1/2 | 2 1/2  | 8         | 18 1/2        | 2 1/2  | 2     | 34      |
| Bessemer K2-4           | 3            | 1/4        | 1               | V              | Vertical               | 11 1/2 | 2 1/2   | 10           | 2 1/2 | 39 1/2    | 55     | 3 1/2  | 2         | 33            | 4 1/2  | 2     | 38      |
| Bethlehem KN-1          | 3            | 1/4        | 1               | V              | Vertical               | 8 1/2  | 2       | 8            | 2     | 35 1/2    | 15 1/2 | 2 1/2  | 1         | 15            | 2 1/2  | 1     | 32      |
| Bethlehem GN-2.         | 3            | 1/4        | 1               | V              | Vertical               | 8 1/2  | 2       | 8            | 2     | 40 1/2    | 16 1/2 | 2 1/2  | 1         | 12 1/2        | 2 1/2  | 1     | 34      |
| Bethlehem HN-3.         | 3            | 1/4        | 1               | V              | Vertical               | 8 1/2  | 2       | 9 1/2        | 2 1/2 | 40 1/2    | 20     | 2 1/2  | 1         | 11 1/2        | 2 1/2  | 1     | 34      |
| Brinton C-1 1/2         | 3            | 1/4        | 1               | V              | Vertical               | 11     | 1 1/2   | 13           | 1 1/2 | 33        | 39     | 1 1/2  | 1         | 13            | 1 1/2  | 2     | 33      |
| Brinton D-2 1/2         | 3            | 1/4        | 1               | V              | Vertical               | 11     | 1 1/2   | 13           | 1 1/2 | 33        | 13     | 3 1/2  | 2         | 13            | 3 1/2  | 2     | 33      |
| Brookway S2-1 1/2       | 3            | 1/4        | 1               | V              | Vertical               | 10 1/2 | 2 1/2   | 5 1/2        | 2 1/2 | 39        | 20     | 2      | 4         | 20            | 2      | 1     | 32      |
| Brookway K4-2 1/2       | 3            | 1/4        | 1               | V              | Vertical               | 6 1/2  | 1 1/2   | 13           | 1 1/2 | 34        | 12     | 3 1/2  | 2         | 12            | 3 1/2  | 2     | 34      |
| Brookway R-2-3 1/2      | 3            | 1/4        | 1               | V              | Vertical               | 9 1/2  | 1 1/2   | 14           | 1 1/2 | 34        | 15 1/2 | 3 1/2  | 4         | 15 1/2        | 3 1/2  | 4     | 36      |
| Brookway T-5.           | 3            | 1/4        | 1               | V              | Vertical               | 13     | 2       | 22           | 2     | 40 %      | 18     | 4      | 4         | 18            | 4      | 4     | 36      |
| Brown Mydel B-2 1/2     | 3            | 1/4        | 1               | V              | Vertical               | 8      | 2 1/2   | 14           | 1 1/2 | 34        | 21     | 2 1/2  | 2         | 21            | 2 1/2  | 2     | 39      |
| Buffalo Tractor-Truck   | 4            | 1/4        | 1               | V              | Vertical               | 7      | 1 1/2   | 6            | 1 1/2 | 47 1/2    | 25 1/2 | 2 1/2  | 4         | 44            | 2 1/2  | 4     | 34      |
| Case.                   | 3            | 1/4        | 1               | V</td          |                        |        |         |              |       |           |        |        |           |               |        |       |         |

## Replacement Table—Continued

| Name, Model and Tonnage                          | ENGINE       |                 |                 |                |                        |                 |          |                 | BRAKE LINING     |      |                  |                   |                 |               | FRAME            |                 |                 |               |                   |                  |
|--|--------------|-----------------|-----------------|----------------|------------------------|-----------------|----------|-----------------|------------------|------|------------------|-------------------|-----------------|---------------|------------------|-----------------|-----------------|---------------|-------------------|------------------|
|  | Piston Rings |                 | Carburetor      |                | Upper Hose             | Lower Hose      | Fan Belt |                 | Service          |      | Emergency        |                   | Length          | Width         | Length           |                 | Width           | Thickness     | No. of Pieces     |                  |
|  | No. per Cyl. | Width           | Outlet Diameter | Inlet Diameter | Vertical or Horizontal | Length          | Width    | Length          | Width            | Type | Length           | Width             | Thickness       | No. of Pieces | Length           | Width           | Thickness       | No. of Pieces | Length            | Width            |
| Clydesdale 18- $\frac{1}{2}$ -1 $\frac{1}{2}$    | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 15                     | 2               | 12       | 2               | 41               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 95                | 34               |
| Clydesdale 10- $\frac{1}{2}$ -1 $\frac{1}{2}$    | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 9                      | 2               | 9        | 2               | 41               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 109              | 34              | 109             | 4             | 109               | 34               |
| Clydesdale 10A-1- $\frac{1}{2}$ -1 $\frac{1}{2}$ | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 109               | 34               |
| Commerce 9-1500                                  | 3            | 1               | 1               | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 92 $\frac{1}{2}$  | 34               |
| Commerce T-1500                                  | 3            | 1               | 1               | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 92 $\frac{1}{2}$  | 34               |
| Commerce 12-3000                                 | 3            | 1               | 1               | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 99 $\frac{1}{2}$  | 34               |
| Commerce 16-4000                                 | 3            | 1               | 1               | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 108 $\frac{1}{2}$ | 34               |
| Commerce 25B-5000                                | 3            | 1               | 1               | V              | 10                     | 2               | 10       | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 132               | 34               |
| Concord A-2                                      | 4            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 11                     | 2               | 9        | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 108 $\frac{1}{2}$ | 32 $\frac{1}{2}$ |
| Concord AX-2                                     | 4            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 11                     | 2               | 9        | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 122 $\frac{1}{2}$ | 32 $\frac{1}{2}$ |
| Concord B-3                                      | 4            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 11                     | 2               | 9        | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 144               | 32 $\frac{1}{2}$ |
| Concord BX-3                                     | 4            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 11                     | 2               | 9        | 2               | 44               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 155 $\frac{1}{2}$ | 32 $\frac{1}{2}$ |
| Corbitt S- $\frac{1}{2}$                         | 3            | 1               | 1               | V              | 8                      | 2               | 14       | 2               | 38               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 105               | 34               |
| Corbitt D-1 $\frac{1}{2}$                        | 3            | 1               | 1               | V              | 8                      | 2               | 14       | 2               | 38               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 120               | 34               |
| Corbitt C-2                                      | 3            | 1               | 1               | V              | 14                     | 1 $\frac{1}{2}$ | 13       | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 138               | 35               |
| Corbitt B-2 $\frac{1}{2}$                        | 3            | 1               | 1               | V              | 14                     | 1 $\frac{1}{2}$ | 13       | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 138               | 35               |
| Corbitt AA-5                                     | 3            | 1               | 1               | V              | 13                     | 1 $\frac{1}{2}$ | 8        | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 160               | 35               |
| Corbitt A-4                                      | 3            | 1               | 1               | V              | 13                     | 2               | 14       | 2               | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 160               | 35               |
| Cyclone A-3000                                   | 3            | 1               | 1               | V              | 16                     | 2               | 16       | 2               | 32 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 113               | 34               |
| Day-Elder AS-1                                   | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 9                      | 2               | 9        | 2               | 40               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 108               | 35               |
| Day-Elder B-1 $\frac{1}{2}$                      | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 9                      | 2               | 9        | 2               | 40               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 120               | 35               |
| Day-Elder D-2                                    | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 10                     | 2               | 12       | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 125               | 35               |
| Day-Elder C-2 $\frac{1}{2}$                      | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 10                     | 2               | 12       | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 123               | 35               |
| Day-Elder F-2 $\frac{1}{2}$                      | 3            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 12 $\frac{1}{2}$       | 2               | 10       | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 148               | 35               |
| Day-Elder E-5                                    | 4            | 1 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | V              | 8                      | 2               | 8        | 1 $\frac{1}{2}$ | 36               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 155               | 35               |
| Dearborn BW-2                                    | 3            | 1               | 1               | V              | 12                     | 2               | 8        | 1 $\frac{1}{2}$ | 37               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 130               | 32               |
| Dearborn F-1 $\frac{1}{2}$                       | 3            | 1               | 1               | V              | 12                     | 2               | 8        | 1 $\frac{1}{2}$ | 37               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 130               | 32               |
| Dearborn C-1                                     | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 107               | 34               |
| Defiance B-1 $\frac{1}{2}$                       | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 116               | 34               |
| Defiance 48-2                                    | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 116               | 34               |
| Defiance D                                       | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 120               | 34               |
| Defiance E                                       | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 120               | 34               |
| Defiance EL                                      | 3            | 1               | 1               | V              | 10                     | 2               | 8        | 2               | 40 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 140               | 34               |
| Denby 31-1 $\frac{1}{2}$                         | 3            | 1               | 1               | V              | 6                      | 2 $\frac{1}{2}$ | 19       | 2 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 97 $\frac{1}{2}$  | 34               |
| Denby 33-2                                       | 3            | 1               | 1               | V              | 8                      | 2               | 12       | 2               | 41               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 120               | 33 $\frac{1}{2}$ |
| Denby 35-3                                       | 3            | 1               | 1               | V              | 8                      | 2               | 12       | 1 $\frac{1}{2}$ | 41 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 140               | 34               |
| Denby 27-4                                       | 3            | 1               | 1               | V              | 13                     | 1 $\frac{1}{2}$ | 16       | 1 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 140               | 34               |
| Denby 210-5                                      | 3            | 1               | 1               | V              | 13                     | 1 $\frac{1}{2}$ | 16       | 1 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 108               | 33 $\frac{1}{2}$ |
| Dependable Dispatch A-1 $\frac{1}{2}$            | 3            | 1               | 1               | V              | 14                     | 2               | 15       | 1 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 121               | 33               |
| Dependable C-2                                   | 3            | 1               | 1               | V              | 10                     | 2               | 12       | 1 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 152               | 33               |
| Dependable D-2 $\frac{1}{2}$                     | 3            | 1               | 1               | V              | 10                     | 2               | 12       | 1 $\frac{1}{2}$ | 38 $\frac{1}{2}$ | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 170               | 33               |
| Dependable G-3 $\frac{1}{2}$                     | 3            | 1               | 1               | V              | 9                      | 1 $\frac{1}{2}$ | 6        | 1 $\frac{1}{2}$ | 35               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | 100               | 34               |
| Diamond T-03-1-1 $\frac{1}{2}$                   | 3            | 1               | 1               | V              | 9                      | 1 $\frac{1}{2}$ | 6        | 1 $\frac{1}{2}$ | 35               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$   | 1 $\frac{1}{2}$ | 4             | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}$ | 1 $\frac{1}{2}$ | 4             | Opt               | 34               |
| Diamond T-FS&T-1 $\frac{1}{2}$                   | 3            | 1               | 1               | V              | 9                      | 1 $\frac{1}{2}$ | 6        | 1 $\frac{1}{2}$ | 35               | %    | 11 $\frac{1}{4}$ | 2 $\frac{1}{2}</$ |                 |               |                  |                 |                 |               |                   |                  |

## Replacement Table—Continued

| Name, Model and Tonnage             | ENGINE       |       |                 |                |                        |        |            |        |          |        | BRAKE LINING |        |           |               |        |       | FRAME     |               |        |         |        |
|-------------------------------------|--------------|-------|-----------------|----------------|------------------------|--------|------------|--------|----------|--------|--------------|--------|-----------|---------------|--------|-------|-----------|---------------|--------|---------|--------|
|                                     | Piston Rings |       | Carburetor      |                | Upper Hose             |        | Lower Hose |        | Fan Belt |        | Service      |        |           | Emergency     |        |       | Length    | Width         |        |         |        |
|                                     | No. per Cyl. | Width | Outlet Diameter | Inlet Diameter | Vertical or Horizontal | Length | Width      | Length | Width    | Type   | Length       | Width  | Thickness | No. of Pieces | Length | Width | Thickness | No. of Pieces | Length | Width   |        |
| G.M.C. K-101                        | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11 1/4 | 1 1/4      | 9 1/4  | 1 1/4    | 37 7/8 | 4            | 17 3/4 | 4         | 17 3/4        | 4      | 1 1/4 | 4         | 1 1/4         | 4      | Opt     | 38     |
| Gramm-Pioneer 10 Speed-1            | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2 1/4      | 14 1/2 | 2 1/4    | 29     | 1            | 48 1/2 | 2         | 45 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 97      | 30 1/2 |
| Gramm-Pioneer 15-1 1/2-2            | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 10 1/4 | 2          | 6      | 2        | 39     | 1            | 19 1/4 | 2         | 19 1/4        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 120     | 32     |
| Gramm-Pioneer 15-1 1/2-2            | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 10 1/4 | 2          | 6      | 2        | 39     | 2            | 45     | 2         | 45            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 120     | 32     |
| Gramm-Pioneer 20-2-2 1/2            | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 4 1/2  | 1 1/2      | 12     | 1 1/2    | 22     | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 126     | 32     |
| Gramm-Pioneer 30-3                  | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 1 1/2      | 9      | 1 1/2    | 33 3/4 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 129 1/2 | 36     |
| Gramm-Pioneer 75P-3 1/2             | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 1 1/2      | 9      | 1 1/2    | 33 3/4 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 129 1/2 | 36     |
| Gramm-Pioneer 40-4                  | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 23 1/4 | 2          | 13 1/4 | 1 1/2    | 40 1/4 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 36     |
| Gramm-Pioneer 50-5-6                | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 1 1/4      | 11     | 1 1/4    | 37     | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 132     | 36     |
| G.W.W.                              | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 8      | 1 1/4      | 12 1/2 | 1 1/4    | 32     | 1            | 11 1/2 | 3         | 15            | 3      | 1 1/2 | 2         | 1 1/2         | 2      | 89      | 32     |
| Hall 2-Worm-2 1/2                   | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12 1/2 | 1 1/4      | 15 1/2 | 1 1/4    | 38 1/2 | 1            | 15     | 2         | 15            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 38     |
| Hall 3 1/2-Worm                     | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12 1/2 | 1 1/4      | 15 1/2 | 1 1/4    | 38 1/2 | 1            | 18     | 4         | 18            | 4      | 1 1/2 | 2         | 1 1/2         | 2      | 180     | 39     |
| Hall 5-Worm                         | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12 1/2 | 1 1/4      | 15 1/2 | 1 1/4    | 38 1/2 | 1            | 18     | 4         | 18            | 4      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 39     |
| Hall 7-Chain                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12 1/2 | 1 1/4      | 15 1/2 | 1 1/4    | 38 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 139     | 32     |
| Harvey WOA-2                        | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 2          | 14     | 1 1/4    | 35 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 108     | 35     |
| Harvey WFB-2 1/2                    | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 14     | 1 1/4    | 35 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 85      | 32     |
| Harvey WHB-3 1/2                    | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 14     | 1 1/4    | 35 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 93      | 35     |
| Harvey WFT-6                        | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 2          | 14     | 1 1/4    | 35 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 90      | 34     |
| Harvey WHT-10                       | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 14     | 1 1/4    | 35 1/2 | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 156     | 34     |
| Hawkeye O                           | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 9      | 1 1/4    | 1 1/2  | 1            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 34     |
| Hawkeye K                           | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 9      | 1 1/4    | 1 1/2  | 1            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 34     |
| Hawkeye M                           | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 14     | 2 1/2      | 12     | 1 1/2    | 2 1/2  | 2            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 34     |
| Hawkeye N                           | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 12     | 2          | 9      | 1 1/4    | 1 1/2  | 1            | 2      | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 34     |
| Hendrickson N-2 1/2                 | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 17     | 1 1/4      | 14     | 1 1/4    | 38 1/2 | 1            | 17 1/2 | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 108     | 32     |
| Hendrickson M-3 1/2                 | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 13     | 1 1/4    | 26 1/2 | 2            | 22     | 2         | 22            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 132     | 34     |
| Hendrickson K-5                     | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 13     | 1 1/4    | 26 1/2 | 2            | 24     | 2         | 24            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 154     | 34     |
| Hurlburt A1 1/2-2                   | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 10     | 1 1/2      | 17 1/2 | 1 1/2    | 26 1/2 | 2            | 28     | 3         | 27            | 3      | 1 1/2 | 2         | 1 1/2         | 2      | 144 1/2 | 34     |
| Hurlburt B2 1/2                     | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 2 1/2  | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 38 1/2 | 2         | 38 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144 1/2 | 34     |
| Hurlburt G3 1/2-4                   | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 2 1/2  | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 2            | 50     | 2         | 50            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144 1/2 | 34     |
| Hurlburt D5-5 1/2                   | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 2 1/2  | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 2            | 68     | 3         | 68            | 3      | 1 1/2 | 2         | 1 1/2         | 2      | 144 1/2 | 34     |
| Indiana 12-1 1/2                    | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 1 1/4      | 14     | 1 1/4    | 38 1/2 | 1            | 17 1/2 | 2         | 2             | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 108     | 32     |
| Indiana 20-2                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 13     | 1 1/4    | 26 1/2 | 2            | 51     | 2         | 51            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 126     | 33     |
| Indiana 25-2 1/2                    | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 13     | 1 1/4    | 26 1/2 | 2            | 56     | 2         | 56            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 138     | 33     |
| Indiana 35-3 1/2                    | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 13     | 1 1/4    | 26 1/2 | 2            | 63     | 2         | 63            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 34     |
| Indiana 51-5                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 10     | 1 1/2      | 17 1/2 | 1 1/2    | 38 1/2 | 1            | 50     | 2         | 50            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 90      | 34     |
| International S-2000 lbs.—Speed Tr. | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 9 1/4      | 17 1/2 | 1 1/2    | 38 1/2 | 1            | 10 1/2 | 2         | 10 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 75 1/2  | 34     |
| International 21-2000 lbs.          | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 9 1/4      | 17 1/2 | 1 1/2    | 38 1/2 | 1            | 43 1/2 | 2         | 43 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 106 1/2 | 34     |
| International 31-3000 lbs.          | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 9 1/4      | 17 1/2 | 1 1/2    | 38 1/2 | 1            | 50     | 2         | 50            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 111 1/2 | 34     |
| International 41-4000 lbs.          | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 9 1/4      | 17 1/2 | 1 1/2    | 38 1/2 | 1            | 50     | 2         | 50            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 217 1/2 | 34     |
| International 52-Bus                | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 9      | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 10 1/2 | 2         | 10 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 118 1/2 | 34     |
| International 61-6000 lbs.          | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 9      | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 50 1/2 | 2         | 50 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 118 1/2 | 34     |
| International 162 Tactor Truck      | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 9      | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 50 1/2 | 2         | 50 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 118 1/2 | 34     |
| International 101-10,000.           | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 9      | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 73 1/2 | 2         | 73 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 147 1/2 | 34     |
| International 102 Tractor Truck     | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 9      | 1 1/2      | 2 1/2  | 1 1/2    | 38 1/2 | 1            | 73 1/2 | 2         | 73 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 147 1/2 | 34     |
| Jackson B-3 1/2                     | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 11     | 1 1/4      | 17     | 1 1/4    | 32 1/2 | 1            | 58 1/2 | 2         | 58 1/2        | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 156     | 36     |
| Kalamazoo G-1                       | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 15 1/2 | 1 1/2      | 8      | 1 1/4    | 40     | 1            | 50     | 2         | 50            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 120     | 32 1/2 |
| Kalamazoo LG                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 6      | 1 1/4      | 16     | 1 1/4    | 39     | 1            | 52     | 2         | 52            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 120     | 32 1/2 |
| Kalamazoo NH                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 20     | 1 1/4      | 19 1/2 | 1 1/2    | 42     | 2            | 52     | 2         | 52            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 144     | 33     |
| Kalamazoo HD                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 20     | 1 1/4      | 19 1/2 | 1 1/2    | 42     | 2            | 57     | 2         | 57            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 152     | 36     |
| Kalamazoo SK                        | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 20     | 1 1/4      | 19 1/2 | 1 1/2    | 42     | 2            | 68     | 3         | 68            | 3      | 1 1/2 | 2         | 1 1/2         | 2      | 152     | 36     |
| Kearns H-1                          | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 16     | 2          | 16     | 2        | 33     | 1            | 42     | 2         | 42            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 90      | 34     |
| Kearns N-2                          | 3            | 1/4   | 1 1/4           | 1 1/2          | V                      | 18     | 2          | 18     | 2        | 33     | 1            | 45     | 2         | 45            | 2      | 1 1/2 | 2         | 1 1/2         | 2      | 120     | 34     |
| Kelly-Springfield K34-1 1/2         | 4            | 1/4   | 1 1/4           | 1 1/2          | V                      | 7      | 1 1/2      | 13     | 1 1/2    | 54 1/2 | 1            | 17 1/2 | 1         | 17 1/2        | 1      | 1 1/2 | 2         | 1 1/2         | 2      | 138     | 34     |
| Kelly-Springfield                   |              |       |                 |                |                        |        |            |        |          |        |              |        |           |               |        |       |           |               |        |         |        |

## Replacement Table—Continued

| Name, Model and Tonnage | ENGINE       |            |                 |                |                        |        |        | BRAKE LINING |        |      |           |       |           |               | FRAME  |                          |           |               |         |        |
|-------------------------|--------------|------------|-----------------|----------------|------------------------|--------|--------|--------------|--------|------|-----------|-------|-----------|---------------|--------|--------------------------|-----------|---------------|---------|--------|
|                         | Piston Rings | Carburetor | Upper Hose      | Lower Hose     | Fan Belt               |        |        | Service      |        |      | Emergency |       |           | Length        | Width  | Back of<br>Driver's Seat |           |               |         |        |
|                         | No. per Cyl. | Width      | Outlet Diameter | Inlet Diameter | Vertical or Horizontal | Length | Width  | Length       | Width  | Type | Length    | Width | Thickness | No. of Pieces | Length | Width                    | Thickness | No. of Pieces | Length  | Width  |
| Master JD               | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 30 1/2 | F    | 8 1/2     | 4 1/2 | 1/8       | 2             | 53 1/2 | 3                        | 1 1/2     | 2             | Opt     | 34 1/2 |
| Master M-2 1/2          | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 33     | F    | 74        | 2 1/2 | 1/8       | 1             | 74 1/2 | 2 1/2                    | 1/8       | 1             | 117 1/2 | 34     |
| Master O 2 1/2          | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 11 1/2 | 1 1/4        | 33     | F    | 75 1/2    | 2 1/2 | 1/8       | 2             | 74 1/2 | 2 1/2                    | 1/8       | 2             | 156 1/2 | 34     |
| Master W-2 1/2          | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 31     | F    | 13 1/2    | 3 1/2 | 1/8       | 2             | 13 1/2 | 3 1/2                    | 1/8       | 2             | 117 1/2 | 34     |
| Master WL-2 1/2         | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 31     | F    | 13 1/2    | 3 1/2 | 1/8       | 2             | 13 1/2 | 3 1/2                    | 1/8       | 2             | 156 1/2 | 34     |
| Master D-2 1/2          | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 35     | F    | 8 1/2     | 4 1/2 | 1/8       | 2             | 54 1/2 | 3                        | 1 1/2     | 2             | 117 1/2 | 34     |
| Master DL-2 1/2         | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 35     | F    | 8 1/2     | 4 1/2 | 1/8       | 2             | 54 1/2 | 3                        | 1 1/2     | 2             | Opt     | 34     |
| Master T-6 Tractor      | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/4        | 35     | F    | 74 1/2    | 2 1/2 | 1/8       | 2             | 74 1/2 | 2 1/2                    | 1/8       | 2             | 172 1/2 | 34     |
| Master A-3 1/2          | 4            | 1 1/4      | 1 1/4           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 35     | F    | 16        | 3 1/2 | 1/8       | 2             | 16     | 3 1/2                    | 1/8       | 2             | 147 1/2 | 34     |
| Master AL-3 1/2         | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 35     | F    | 16        | 3 1/2 | 1/8       | 2             | 16     | 3 1/2                    | 1/8       | 2             | 183 1/2 | 34     |
| Master E-3 1/2          | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 35     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 4             | 147 1/2 | 34     |
| Master Y-4              | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 35     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 4             | Opt     | 34     |
| Master EL-3 1/2         | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 35     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 4             | 183 1/2 | 34     |
| Master B-5              | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 4     | 1/8       | 2             | 18     | 4                        | 1 1/2     | 2             | 162 1/2 | 34     |
| Master BL-5             | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/2        | 37     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 186 1/2 | 34     |
| Master F-5              | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/2        | 37     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 186 1/2 | 34     |
| Master FL-5             | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/2        | 37     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 186 1/2 | 34     |
| Master DDT-6            | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/2        | 35     | F    | 8 1/2     | 4 1/2 | 1/8       | 2             | 56 1/2 | 3                        | 1 1/2     | 2             | Opt     | 34     |
| Master DT-6 Tractor     | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/2        | 35     | F    | 8 1/2     | 4 1/2 | 1/8       | 2             | 54     | 3                        | 1 1/2     | 2             | 72 1/2  | 43     |
| Maxwell 1 1/2           | 4            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/2        | 36     | F    | 31        | 1 1/2 | 1/8       | 4             | 19 1/2 | 1 1/2                    | 1/8       | 2             | 102 1/2 | 34     |
| Menominee Hurryton-1    | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 12 1/2 | 1 1/2        | 40     | F    | 11        | 2 1/2 | 1/8       | 4             | 4      | 1 1/2                    | 1/8       | 1             | 122     | 32     |
| Menominee H-1 1/2       | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 4     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 146     | 32     |
| Menominee D-2           | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 4     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 102 1/2 | 32     |
| Menominee HT-1 1/2      | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 4     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 102 1/2 | 32     |
| Menominee RX-5          | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 6     | 1/8       | 2             | 23     | 4                        | 1 1/2     | 2             | 149     | 38     |
| Menominee G-3 1/2       | 3            | 1 1/2      | 1 1/2           | V              | 13 1/2                 | 2      | 15     | 1 1/4        | 37     | F    | 13 1/2    | 6     | 1/8       | 2             | 20     | 4                        | 1 1/2     | 2             | 149     | 36     |
| Moline 10               | 3            | 1 1/2      | 1 1/2           | H              | 10 1/2                 | 2      | 21 1/2 | 2 1/4        | 39     | F    | 21        | 2 1/2 | 1/8       | 2             | 21     | 2 1/2                    | 1/8       | 2             | 108     | 32     |
| Moreland RR             | 3            | 1 1/2      | 1 1/2           | H              | 8                      | 1 1/2  | 11 1/4 | 1 1/2        | 34     | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | 108     | 34     |
| Moreland BX-1 1/2       | 3            | 1 1/2      | 1 1/2           | H              | 8                      | 1 1/2  | 11 1/4 | 1 1/2        | 34     | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | 108     | 34     |
| Moreland EX-2           | 3            | 1 1/2      | 1 1/2           | H              | 9                      | 1 1/2  | 13     | 1 1/2        | 42     | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | 132     | 34     |
| Moreland AX-3           | 3            | 1 1/2      | 1 1/2           | H              | 9                      | 1 1/2  | 13     | 1 1/2        | 42     | F    | 13 1/2    | 3 1/2 | 1/8       | 2             | 13 1/2 | 3 1/2                    | 1/8       | 2             | 174     | 34     |
| Moreland RX-5           | 3            | 1 1/2      | 1 1/2           | H              | 9                      | 2      | 19     | 2            | 42     | F    | 16        | 3 1/2 | 1/8       | 2             | 16     | 3 1/2                    | 1/8       | 2             | 192     | 38     |
| Napoleon 9-1            | 3            | 1          | 1               | H              | 6 1/2                  | 2 1/4  | 14     | 2 1/4        | 39     | F    | 21        | 4     | 1/8       | 1             | 30     | 1 1/2                    | 1/8       | 1             | 100 1/2 | 35     |
| Napoleon 11-1 1/2       | 3            | 1          | 1               | H              | 6 1/2                  | 2 1/4  | 14     | 2 1/4        | 39     | F    | 21        | 4     | 1/8       | 1             | 30     | 1 1/2                    | 1/8       | 1             | 100 1/2 | 35     |
| Nash 2018-1-1 1/2       | 4            | 1 1/2      | 1 1/2           | V              | 7 1/2                  | 1 1/2  | 36     | 1            | 44     | F    | 49 1/2    | 2 1/2 | 1/8       | 2             | 20 1/2 | 2 1/2                    | 1/8       | 2             | 104 1/2 | 30     |
| Nash 3018-2-2 1/2       | 4            | 1 1/2      | 1 1/2           | V              | 7 1/2                  | 1 1/2  | 36     | 1            | 44     | F    | 49 1/2    | 2 1/2 | 1/8       | 2             | 25 1/2 | 2 1/2                    | 1/8       | 2             | 118 1/2 | 31     |
| Nash 4017-2-2 1/2       | 3            | 1          | 1               | V              | 7                      | 1 1/2  | 44     | 2            | 44     | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | 117 1/2 | 38     |
| Nelson & LeMoon G-2     | 4            | 1 1/2      | 1 1/2           | V              | 9                      | 1 1/2  | 31     | 1 1/2        | 41 1/4 | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | Opt     | 34     |
| Nelson & LeMoon G-3     | 4            | 1 1/2      | 1 1/2           | V              | 9                      | 1 1/2  | 31     | 1 1/2        | 41 1/4 | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | Opt     | 34     |
| Nelson & LeMoon G-4     | 4            | 1 1/2      | 1 1/2           | V              | 9                      | 1 1/2  | 31     | 1 1/2        | 41 1/4 | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | Opt     | 34     |
| Nelson & LeMoon G-5     | 4            | 1 1/2      | 1 1/2           | V              | 9                      | 1 1/2  | 31     | 1 1/2        | 41 1/4 | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | Opt     | 34     |
| Netco DK-2              | 3            | 1 1/2      | 1 1/2           | H              | 12                     | 1 1/2  | 16     | 1 1/4        | 40     | F    | 13 1/2    | 3 1/2 | 1/8       | 4             | 13 1/2 | 3 1/2                    | 1/8       | 4             | 139     | 34     |
| Netco HL-2 1/2-3        | 3            | 1 1/2      | 1 1/2           | H              | 13                     | 1 1/2  | 16     | 1 1/4        | 40     | F    | 13 1/2    | 3 1/2 | 1/8       | 4             | 13 1/2 | 3 1/2                    | 1/8       | 4             | 147     | 56     |
| Niles E-2               | 3            | 1 1/2      | 1 1/2           | V              | 8                      | 1 1/2  | 30     | 1 1/2        | 42     | F    | 12        | 3 1/2 | 1/8       | 2             | 12     | 3 1/2                    | 1/8       | 2             | 102     | 34     |
| Noble A21-1 1/2         | 4            | 1 1/2      | 1 1/2           | V              | 10                     | 1 1/2  | 33     | 1 1/2        | 44     | F    | 19        | 2 1/2 | 1/8       | 2             | 19     | 2 1/2                    | 1/8       | 2             | 126     | 34     |
| Noble B31-2             | 4            | 1 1/2      | 1 1/2           | V              | 7                      | 1 1/2  | 33     | 1 1/2        | 44     | F    | 24        | 2 1/2 | 1/8       | 2             | 24     | 2 1/2                    | 1/8       | 2             | 34      | 34     |
| Noble D51-2 1/2         | 4            | 1 1/2      | 1 1/2           | V              | 9                      | 2      | 12     | 1 1/4        | 34     | F    | 21        | 2 1/2 | 1/8       | 2             | 21     | 2 1/2                    | 1/8       | 2             | 36      | 34     |
| Noble E71-3 1/2         | 4            | 1 1/2      | 1 1/2           | V              | 14 1/2                 | 2      | 16     | 1 1/4        | 34     | F    | 57        | 2 1/2 | 1/8       | 2             | 50 1/2 | 2 1/2                    | 1/8       | 2             | 133     | 33     |
| Northway B-2-2          | 3            | 1 1/2      | 1 1/2           | V              | 5 1/2                  | 2 1/2  | 13 1/2 | 1 1/2        | 46     | F    | 54        | 2 1/2 | 1/8       | 2             | 54     | 2 1/2                    | 1/8       | 2             | 173     | 34     |
| Northway B-3 3 1/2      | 3            | 1 1/2      | 1 1/2           | V              | 5 1/2                  | 2 1/2  | 13 1/2 | 1 1/2        | 46     | F    | 11        | 2 1/2 | 1/8       | 2             | 11     | 2 1/2                    | 1/8       | 2             | 108     | 34     |
| Ogden A-2 1/2           | 3            | 1          | 1               | H              | 12                     | 2      | 6      | 2            | 44     | F    | 3 1/2     | 1/8   | 2         | 4             | 10 1/2 | 1 1/2                    | 1/8       | 1             | 144     | 34     |
| Ogden D-2 1/2           | 3            | 1          | 1               | H              | 13                     | 2      | 12     | 2            | 44     | F    | 3 1/2     | 1/8   | 2         | 4             | 10 1/2 | 1 1/2                    | 1/8       | 1             | 144     | 34     |
| Ogden E-2 1/2           | 3            | 1          | 1               | H              | 13                     | 2      | 12     | 2            | 44     | F    | 3 1/2     | 1/8   | 2         | 4             | 25     | 2 1/2                    | 1/8       | 1             | 168     | 37     |
| Ogden F-3 1/2           | 3            | 1          | 1               | H              | 11                     | 1 1/2  | 36     | 1 1/2        | 40     | F    | 11        | 2 1/2 | 1/8       | 2             | 38     | 2 1/2                    | 1/8       | 2             | 117     | 34     |
| Ogden G-5               | 3            | 1 1/2      | 1 1/2           | V              | 9                      | 2      | 18     | 1 1/2        | 40     | F    | 53        | 2 1/2 | 1/8       | 2             | 62     | 2 1/2                    | 1/8       | 2             | 121     | 34     |
| O. K. 1-1/2             | 3            | 1 1/2      | 1 1/2           | V              | 12                     | 2      | 13 1/2 | 1 1/2        | 36     | F    | 62        | 2 1/2 | 1/8       | 2             | 62     | 2 1/2                    | 1/8       | 2             | 133     | 34     |
| O. K. 2-1/2             | 4            | 1 1/2      | 1 1/2           | V              | 12                     | 2      | 13 1/2 | 1 1          |        |      |           |       |           |               |        |                          |           |               |         |        |

### Replacement Table—Continued

| Name, Model and Tonnage    | ENGINE       |                 |                        |            |          |        | BRAKE LINING |      |        |           |           |               | FRAME*        |        |         |
|----------------------------|--------------|-----------------|------------------------|------------|----------|--------|--------------|------|--------|-----------|-----------|---------------|---------------|--------|---------|
|                            | Piston Rings | Carburetor      | Upper Hose             | Lower Hose | Fan Belt |        | Service      |      |        | Emergency |           |               | Length        | Width  |         |
|                            | No. per Cyl. | Outlet Diameter | Vertical or Horizontal | Length     | Width    | Length | Width        | Type | Length | Width     | Thickness | No. of Pieces | No. of Pieces | Length | Width   |
| Republic 10-1-10E-1        | 3            | 1               | V                      | 12 1/4     | 2        | 6      | 2            | F    | 21 1/4 | 2 1/2     | 19 1/4    | 4             | 4             | 2 1/4  | 34      |
| Republic 11X-1-1           | 3            | 1               | V                      | 12 1/4     | 2        | 6      | 2            | F    | 24 1/4 | 2 1/2     | 24 1/4    | 4             | 4             | 2 1/4  | 34      |
| Republic 19-2-1/2          | 3            | 1               | V                      | 8          | 1 1/2    | 11 1/4 | 1 1/4        | F    | 24 1/4 | 2 1/2     | 24 1/4    | 4             | 4             | 2 1/4  | 34      |
| Republic 20-3-1/2          | 3            | 1               | V                      | 7 1/4      | 1 1/2    | 5 1/2  | 1 1/4        | F    | 25 1/4 | 2 1/2     | 30 1/2    | 2             | 1             | 1 1/4  | 37      |
| Republic Rapid Transit-3/4 | 3            | 1               | V                      | 12         | 2 1/2    | 18 1/2 | 2 1/2        | F    | 55 1/4 | 3 1/2     | 44 1/2    | 2             | 1             | 1 1/4  | 95      |
| Rowe CW-1 1/2              | 3            | 1               | V                      | 10 1/2     | 1 1/2    | 10 1/2 | 1 1/2        | F    | 19     | 2         | 19        | 4             | 4             | 2 1/2  | 33      |
| Rowe CDW-2                 | 3            | 1               | V                      | 10 1/2     | 1 1/2    | 10 1/2 | 1 1/2        | F    | 21 1/4 | 2 1/2     | 24 1/2    | 4             | 4             | 2 1/2  | 33      |
| Rowe CDW-2 1/2             | 4            | 1               | V                      | 20         | 1 1/2    | 15 1/2 | 1 1/2        | F    | 24     | 2 1/2     | 24        | 4             | 4             | 2 1/2  | 33      |
| Rowe GSW-3                 | 3            | 1               | V                      | 20         | 1 1/2    | 15 1/2 | 1 1/2        | F    | 36 1/4 | 2 1/2     | 36 1/4    | 4             | 4             | 2 1/2  | 33      |
| Rowe HW-4                  | 3            | 1               | V                      | 20         | 1 1/2    | 15 1/2 | 1 1/2        | F    | 56 1/4 | 2 1/2     | 56 1/4    | 2             | 2             | 2 1/2  | 36      |
| Rowe FW-5                  | 3            | 1               | V                      | 20         | 1 1/2    | 15 1/2 | 1 1/2        | F    | 68     | 3         | 68        | 2             | 2             | 2 1/2  | 33      |
| Rowe GPW-3                 | 3            | 1               | V                      | 10         | 1 1/4    | 6      | 1 1/4        | F    | 24     | 2 1/2     | 24        | 4             | 4             | 2 1/2  | 33      |
| Rumely A-1 1/2             | 4            | 1               | V                      | 10 1/2     | 1 1/2    | 10 1/2 | 1 1/2        | F    | 18     | 2         | 18        | 4             | 4             | 2 1/2  | 34      |
| Samson 15-3 1/2            | 4            | 1               | V                      | 6 1/2      | 1 1/2    | 7 1/2  | 1 1/2        | F    | 37     | 1 1/2     | 35 1/2    | 1             | 1             | 1 1/2  | 39 1/2  |
| Samson 25-1 1/2            | 3            | 1               | V                      | 9          | 2 1/2    | 11     | 1 1/2        | F    | 43 3/4 | 2 1/2     | 43 3/4    | 1             | 1             | 1 1/2  | 39 1/2  |
| Sanford W15-1 1/2          | 3            | 1               | V                      | 8          | 1 1/2    | 11     | 1 1/2        | F    | 22 1/4 | 2 1/2     | 22 1/4    | 2             | 2             | 2 1/2  | 32      |
| Sanford 25-2 1/2           | 3            | 1               | V                      | 9          | 2 1/2    | 11     | 1 1/2        | F    | 55 1/4 | 2 1/2     | 55 1/4    | 2             | 2             | 2 1/2  | 35      |
| Sanford 35-3 1/2           | 3            | 1               | V                      | 9          | 2 1/2    | 11     | 1 1/2        | F    | 65     | 2 1/2     | 65        | 2             | 2             | 2 1/2  | 35      |
| Sanford 50-5               | 3            | 1               | V                      | 9          | 2 1/2    | 11     | 1 1/2        | F    | 15 1/4 | 1 1/4     | 15 1/4    | 4             | 4             | 1 1/4  | 35      |
| Schacht F-2                | 4            | 2               | H                      | 11         | 2        | 14     | 1 1/4        | F    | 8 1/4  | 3         | 8 1/4     | 4             | 4             | 1 1/4  | 35      |
| Schacht F-3                | 4            | 2               | H                      | 10 1/2     | 2        | 13 1/2 | 1 1/4        | F    | 8 1/4  | 3         | 8 1/4     | 4             | 4             | 1 1/4  | 35      |
| Schacht E-4                | 4            | 2               | H                      | 10 1/2     | 2        | 13 1/2 | 1 1/4        | F    | 8 1/4  | 3         | 8 1/4     | 4             | 4             | 1 1/4  | 35      |
| Schacht E-5                | 4            | 2               | H                      | 10 1/2     | 2        | 13 1/2 | 1 1/4        | F    | 8 1/4  | 3         | 8 1/4     | 4             | 4             | 1 1/4  | 35      |
| Schacht E-7                | 4            | 2               | H                      | 9 1/2      | 2 1/4    | 13     | 2 1/4        | F    | 15 1/4 | 2 1/4     | 15 1/4    | 4             | 4             | 1 1/4  | 35      |
| Schwartz A-1               | 1            | 1               | V                      | 9 1/2      | 1 1/2    | 18     | 1 1/4        | F    | 20 1/4 | 2 1/4     | 20 1/4    | 2             | 2             | 2 1/4  | 34      |
| Schwartz K-2               | 1            | 1               | V                      | 10 1/2     | 1 1/2    | 15     | 1 1/4        | F    | 51 1/4 | 2 1/4     | 51 1/4    | 2             | 2             | 2 1/4  | 34      |
| Schwartz LS-L-LL-3         | 1            | 1               | V                      | 12 1/2     | 2        | 17     | 1 1/4        | F    | 69 1/4 | 3         | 69 1/4    | 4             | 4             | 3 1/4  | 36      |
| Schwartz MS-M-ML-5         | 1            | 1               | V                      | 12 1/2     | 2        | 17     | 1 1/4        | F    | 11 1/2 | 3 1/4     | 11 1/2    | 4             | 4             | 3 1/4  | 34      |
| Selden Unit 30             | 3            | 1               | V                      | 3 1/2      | 1 1/4    | 12     | 1 1/4        | F    | 31     | 1 1/2     | 31        | 4             | 4             | 3 1/4  | 34      |
| Selden Unit 50             | 3            | 1               | V                      | 3 1/2      | 1 1/4    | 12     | 1 1/4        | F    | 31     | 1 1/2     | 31        | 4             | 4             | 3 1/4  | 34      |
| Selden Unit 31             | 3            | 1               | V                      | 9          | 1 1/4    | 5 1/2  | 1 1/4        | F    | 15 1/4 | 3 1/4     | 15 1/4    | 4             | 4             | 3 1/4  | 34      |
| Selden Unit 70             | 3            | 1               | V                      | 7 1/2      | 1 1/2    | 15 1/2 | 1 1/2        | F    | 17 1/4 | 4         | 17 1/4    | 4             | 4             | 3 1/4  | 34      |
| Selden Unit 51             | 3            | 1               | V                      | 13 1/2     | 1 1/2    | 16 1/2 | 1 1/2        | F    | 19 1/2 | 1 1/2     | 19 1/2    | 2             | 2             | 2 1/2  | 37 1/2  |
| Selden Unit 90             | 3            | 1               | V                      | 10 1/2     | 1 1/2    | 12 1/2 | 1 1/2        | F    | 41     | 1 1/2     | 41        | 2             | 2             | 2 1/2  | 32      |
| Service 12-3/2             | 3            | 1               | V                      | 12         | 2        | ...    | ...          | F    | 11 1/2 | 3 1/4     | 11 1/2    | 4             | 4             | 3 1/4  | 34      |
| Service 25-1 1/2           | 3            | 1               | V                      | 3 1/2      | 1 1/4    | 12     | 1 1/4        | F    | 13     | 3 1/2     | 13        | 4             | 4             | 3 1/4  | 34      |
| Service 21-1 1/2           | 3            | 1               | V                      | 9          | 1 1/4    | 5 1/2  | 1 1/4        | F    | 15 1/4 | 3 1/4     | 15 1/4    | 4             | 4             | 3 1/4  | 34      |
| Service 32-2               | 3            | 1               | V                      | 10         | 2        | 8      | 1 1/4        | F    | 12     | 3 1/4     | 12        | 2             | 2             | 3 1/4  | 34      |
| Service 37-2               | 3            | 1               | V                      | 10         | 2        | 8      | 1 1/4        | F    | 12     | 3 1/4     | 12        | 2             | 2             | 3 1/4  | 34      |
| Service 52-3               | 3            | 1               | V                      | 10         | 2        | 8      | 1 1/4        | F    | 13 1/2 | 3 1/4     | 13 1/2    | 2             | 2             | 3 1/4  | 34      |
| Service 72-3 1/2           | 3            | 1               | V                      | 10         | 2        | 8      | 1 1/4        | F    | 16     | 3 1/4     | 16        | 2             | 2             | 3 1/4  | 38      |
| Service 77-4               | 3            | 1               | V                      | 10         | 2        | 10     | 1 1/4        | F    | 18 1/2 | 4         | 18 1/2    | 2             | 2             | 4 1/2  | 38      |
| Service 102-6              | 3            | 1               | V                      | 7 1/2      | 1 1/2    | 12     | 1 1/4        | F    | 11     | 3         | 11        | 2             | 2             | 3 1/4  | 38      |
| Signal NF-1                | 3            | 1               | V                      | 8          | 1 1/2    | 9      | 1 1/2        | F    | 11     | 3         | 11        | 4             | 4             | 3 1/4  | 34      |
| Signal H 1 1/2             | 3            | 1               | V                      | 10         | 1 1/2    | 12     | 1 1/2        | F    | 13 1/2 | 3 1/4     | 13 1/2    | 4             | 4             | 3 1/4  | 34      |
| Signal J-2 1/2             | 3            | 1               | V                      | 5 1/2      | 1 1/2    | 12     | 1 1/2        | F    | 15 1/2 | 3 1/4     | 15 1/2    | 4             | 4             | 3 1/4  | 34      |
| Signal M 3 1/2             | 3            | 1               | V                      | 8          | 2 1/2    | 16     | 2            | F    | 18 1/2 | 4         | 18 1/2    | 4             | 4             | 4 1/2  | 38      |
| Signal R-5                 | 3            | 1               | V                      | 10 1/2     | 2        | 14 1/2 | 1 1/2        | F    | 21 1/2 | 1 1/2     | 21 1/2    | 4             | 4             | 2 1/2  | 32      |
| Standard 75-3 1/2-1        | 3            | 1               | V                      | 10 1/2     | 2        | 14 1/2 | 1 1/2        | F    | 39 1/4 | 1 1/2     | 39 1/4    | 4             | 4             | 2 1/2  | 40 1/2  |
| Standard I-K-1-1 1/2       | 3            | 1               | V                      | 10 1/2     | 2        | 14 1/2 | 1 1/2        | F    | 39 1/4 | 1 1/2     | 39 1/4    | 4             | 4             | 2 1/2  | 40 1/2  |
| Standard 76-2 1/2-3        | 3            | 1               | V                      | 12         | 2        | 18     | 1 1/2        | F    | 31 1/2 | 1 1/2     | 31 1/2    | 4             | 4             | 2 1/2  | 32      |
| Standard 66-3 1/2-4        | 3            | 1               | V                      | 19 1/2     | 1 1/2    | 19 1/2 | 1 1/2        | F    | 36 1/2 | 1 1/2     | 36 1/2    | 4             | 4             | 2 1/2  | 38      |
| Standard 5K-5 7            | 3            | 1               | V                      | 6          | 1 1/2    | 19     | 1 1/2        | F    | 42     | 1 1/2     | 42        | 4             | 4             | 2 1/2  | 44      |
| Sterling 1 1/2             | 3            | 1               | V                      | 8          | 1 1/2    | 19     | 1 1/2        | F    | 42 1/2 | 1 1/2     | 42 1/2    | 4             | 4             | 2 1/2  | 44      |
| Sterling 2                 | 3            | 1               | V                      | 11         | 1 1/2    | 19     | 1 1/2        | F    | 38     | 1 1/2     | 38        | 4             | 4             | 2 1/2  | 44      |
| Sterling 3 1/2             | 3            | 1               | V                      | 11         | 1 1/2    | 19     | 1 1/2        | F    | 38     | 1 1/2     | 38        | 4             | 4             | 2 1/2  | 44      |
| Sterling 5-Worm            | 3            | 1               | V                      | 11         | 1 1/2    | 19     | 1 1/2        | F    | 40 1/2 | 1 1/2     | 40 1/2    | 4             | 4             | 2 1/2  | 44      |
| Sterling 5-Chain           | 3            | 1               | V                      | 11         | 1 1/2    | 19     | 1 1/2        | F    | 40 1/2 | 1 1/2     | 40 1/2    | 4             | 4             | 2 1/2  | 44      |
| Sterling 7 1/2             | 3            | 1               | V                      | 11         | 1 1/2    | 19     | 1 1/2        | F    | 40 1/2 | 1 1/2     | 40 1/2    | 4             | 4             | 2 1/2  | 44      |
| Stewart M15-1              | 3            | 1               | V                      | 14         | 2 1/4    | 14     | 2 1/4        | F    | 48 1/2 | 2         | 48 1/2    | 2             | 2             | 2 1/2  | 99 1/2  |
| Stewart M9-1 1/2           | 3            | 1               | V                      | 18         | 1 1/4    | 15     | 1 1/4        | F    | 50 1/2 | 2         | 50 1/2    | 2             | 2             | 2 1/2  | 119 1/2 |
| Stewart M7X                | 3            | 1               | V                      | 18         | 1 1/4    | 15     | 1 1/4        | F    | 60     | 3         | 60        | 2             | 2             | 2 1/2  | 132 1/2 |
| Stewart M10X               | 3            | 1               | V                      | 18         | 1 1/4    | 15     | 1 1/4        | F    | 16 1/2 | 1 1/2     | 16 1/2    | 4             | 4             | 2 1/2  | 138     |
| Stoughton C-4              | 3            | 1               | V                      | 19         | 1 1/2    | 15     | 1 1/2        | F    | 19     | 2         | 19        | 2             | 2             | 2 1/2  | 88      |
| Stoughton A-1              | 3            | 1               | V                      | 19         | 1 1/2    | 15     | 1 1/2        | F    | 23     | 2         | 23        | 4             | 4             | 2 1/2  | 116     |
| Stoughton B-1 1/2          | 3            | 1               | V                      | 19         | 1 1/2    | 15     | 1 1/2        | F    | 23     | 2         | 23        | 4             | 4             | 2 1/2  | 116     |
| Stoughton D-2              | 3            | 1               | V                      | 12         | 2        | 15     | 1 1/4        | F    | 24 1/2 | 1 1/2     | 24 1/2    | 4             | 4             | 2 1/2  | 127     |
| Stoughton F-3              | 3            | 1               | V                      | 19         | 1 1/2    | 19     | 1 1/2        | F    | 37 1/2 | 1 1/2     | 37 1/2    | 4             | 4             | 2 1/2  | 127     |
| Super Truck 50             | 3            | 1               | V                      | 19 1/2     | 1 1/2    | 19     | 1 1/2        | F    | 37 1/2 | 1 1/2     | 37 1/2    | 4             | 4             | 2 1/2  | 135     |
| Super Truck 70             | 3            | 1               | V                      | 19 1/2     | 1 1/2    | 19     | 1 1/2        | F    | 55 1/2 | 2         | 55 1/2    | 2             | 2             | 2 1/2  | 144     |
| Super Truck 100            | 3            | 1               | V                      | 9          | 1 1/2    | 19     | 1 1/2        | F    | 68     | 3         | 68        | 3             | 2             | 2 1/2  | 144     |
| Thomart Speed              | 3            | 1               | V                      | 14         | 2 1/4    | 7      | 2 1/4        | F    | 46     | 2         | 46        | 1             | 1             | 2 1/2  | 102     |
| Tiffin GW-1 1/2            | 3            | 1               | V                      | 14         | 2 1/4    | 11 1/2 | 1 1/2        | F    | 52     | 2         | 52        | 2             | 2             | 2 1/2  | 35      |
| Tiffin MW-2 1/2            | 3            | 1               | V                      | 14         | 2 1/4    | 11 1/2 | 1 1/2        | F    | 58     | 3         | 58        | 1             | 1             | 2 1/2  | 151     |
| Tiffin F-35-3 1/2          | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 68     | 3         | 68        | 1             | 1             | 2 1/2  | 156     |
| Tiffin TW-5                | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 68     | 3         | 68        | 1             | 1             | 2 1/2  | 156     |
| Tiffin UW-6                | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 60     | 2 1/4     | 60        | 2             | 2             | 2 1/2  | 156     |
| Titan 3 1/2                | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 90     | 2 1/4     | 90        | 2             | 2             | 2 1/2  | 144     |
| Titan 5-6-5                | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 54     | 2 1/4     | 54        | 2             | 2             | 2 1/2  | 144     |
| Titan 2 1/2                | 3            | 1               | V                      | 14         | 2 1/4    | 12     | 2            | F    | 47     | 2 1/4     | 47        | 2             | 2             | 2 1/2  | 144     |
| Tower J-1 1/2              | 3            | 1               | V                      | 7          | 2        | 17     | 1 1/2        | F    | 11 1/4 | 3 1/4     | 11 1/4    | 4             | 4             | 3 1/4  | 32      |
| Tower H-2 1/2              | 3            | 1               | V                      | 7          | 2        | 17     | 1 1/2        | F    | 13 1/4 | 3 1/4     | 13 1/4    | 4             | 4             | 3 1/4  | 32      |
| Tower G-3 1/2              | 3            | 1               | V                      | 7 1/2      | 2        | 17     | 1 1/2        | F    | 15 1/4 | 3 1/4     | 15 1/4    | 4             | 4             | 3 1/4  | 32      |
| Traffic C-4000             | 3            | 1               | V                      | 10 1/2     | 2        | 17     | 1 1/2        | F    | 41 1/4 | 1 1/2     | 41 1/4    | 4             | 4             | 2 1/2  | 42      |
| Traffic 6000               | 3            | 1               | V                      | 10 1/2     | 2        | 17     | 1 1/2        | F    | 41 1/4 | 1 1/2     | 41 1/4    | 4             | 4             | 2 1/2  | 42      |
| Traffic Speedboy           | 3            | 1               | V                      | 10 1/2     | 2        | 17     | 1 1/2        | F    | 43 1/2 | 2         | 43 1/2    | 2             | 2             | 2 1/2  | 86      |
| Transport 15-1             | 3            | 1               | V                      | 12         | 2        | 17     | 1 1/2        | F    | 48     | 2         | 48        | 2             | 2             | 2 1/2  | 34      |
| Transport 25-1 1/2         | 3            | 1               | V                      | 10 1/2     | 2        | 17     | 1 1/2        | F    | 11 1/2 | 3 1/4     | 11 1/2    | 4             | 4             | 2 1/2  | 34      |
| Transport 35-2             | 3            | 1               | V                      | 9 1/2      | 2        | 16     | 1 1/2        | F    | 10 1/2 | 3         |           |               |               |        |         |

## Replacement Table—Continued

| Name, Model and Tonnage     | ENGINE       |              |       |                 |                |                        |        | BRAKE LINING |         |        |           |        |           |               | FRAME   |        |    |
|-----------------------------|--------------|--------------|-------|-----------------|----------------|------------------------|--------|--------------|---------|--------|-----------|--------|-----------|---------------|---------|--------|----|
|                             | Piston Rings | Carburetor   |       | Upper Hose      | Lower Hose     | Fan Belt               |        |              | Service |        | Emergency |        | Length    | Width         | Length  | Width  |    |
|                             |              | No. per Cyl. | Width | Outlet Diameter | Inlet Diameter | Vertical or Horizontal | Length | Width        | Length  | Type   | Length    | Width  | Thickness | No. of Pieces |         |        |    |
| Triumph HB-2½.              | 4            | 16           | ...   | V               | 9              | 1 1/8                  | 17     | 1 1/4        | 32 1/2  | F      | 46        | 2 1/2  | 1/8       | 2             | 32      | 2 1/2  |    |
| Triumph HC-2...             | 4            | 16           | ...   | V               | 11             | 2 1/8                  | 17     | 1 1/4        | 32 1/2  | F      | 46        | 2 1/2  | 1/8       | 2             | 32      | 2 1/2  |    |
| Ultimate A-2...             | 4            | 16           | ...   | V               | 11             | 2                      | 8      | 1 1/4        | 34      | F      | 20        | 2 1/2  | 1/8       | 2             | 45      | 2 1/2  |    |
| Ultimate AJ2...             | 4            | 16           | ...   | V               | 11             | 2                      | 8      | 1 1/4        | 34      | F      | 20        | 2 1/2  | 1/8       | 2             | 45      | 2 1/2  |    |
| Ultimate AJL-2...           | 4            | 16           | ...   | V               | 11             | 2                      | 8      | 1 1/4        | 34      | F      | 20        | 2 1/2  | 1/8       | 2             | 45      | 2 1/2  |    |
| Ultimate B-3...             | 4            | 16           | ...   | V               | 11             | 2                      | 8      | 1 1/4        | 34      | F      | 51        | 2 1/2  | 1/8       | 2             | 51      | 2 1/2  |    |
| Ultimate BL3...             | 4            | 16           | ...   | V               | 11             | 2                      | 8      | 1 1/4        | 34      | F      | 51        | 2 1/2  | 1/8       | 2             | 51      | 2 1/2  |    |
| Ultimate D-5...             | 4            | 16           | ...   | V               | 20             | 1 1/4                  | 19 1/2 | 1 1/2        | 37 1/2  | F      | 26        | 4 1/2  | 1/8       | 1             | 52      | 4 1/2  |    |
| Union FW-2½...              | 3            | 24           | ...   | V               | 20             | 1 1/4                  | 19 1/2 | 1 1/2        | 37 1/2  | F      | 26        | 4 1/2  | 1/8       | 1             | 32      | 4 1/2  |    |
| Union H-4...                | 3            | 24           | ...   | V               | 20             | 1 1/4                  | 19 1/2 | 1 1/2        | 37 1/2  | F      | 26        | 4 1/2  | 1/8       | 1             | 24      | 4 1/2  |    |
| Union HW-4...               | 3            | 24           | ...   | V               | 20             | 1 1/4                  | 19 1/2 | 1 1/2        | 37 1/2  | F      | 48        | 1 1/2  | 1/8       | 1             | 48      | 1 1/2  |    |
| United 1½...                | 4            | 16           | 1     | H               | 15             | 2 1/2                  | 16     | 1 1/4        | 37 1/2  | F      | 49        | 3      | 1/8       | 1             | 49      | 1 1/2  |    |
| United 2½...                | 4            | 16           | 1 1/2 | H               | 7              | 2 1/2                  | 12     | 1 1/4        | 37 1/2  | F      | 62        | 3      | 1/8       | 1             | 58      | 2 1/2  |    |
| United 3½...                | 4            | 16           | 1 1/2 | H               | 7              | 2 1/2                  | 7      | 1 1/4        | 37 1/2  | F      | 82 1/2    | 2 1/2  | 1/8       | 1             | 88 1/2  | 2 1/2  |    |
| United 5...                 | 4            | 16           | 1 1/2 | H               | 14 1/2         | 2 1/2                  | 12     | 1 1/4        | 37 1/2  | F      | 50 1/2    | 2 1/2  | 1/8       | 2             | 46 1/2  | 1 1/2  |    |
| U.S.N.-1½...                | 3            | 24           | M     | 1               | 11 1/2         | 2                      | 9      | 1 1/4        | 37      | F      | 19 1/2    | 2 1/2  | 1/8       | 4             | 19 1/2  | 2 1/2  |    |
| U.S.N.W.-1½...              | 3            | 24           | M     | 11 1/2          | 2              | 9                      | 1 1/4  | 37           | F       | 21     | 2 1/2     | 1/8    | 2         | 50            | 2 1/2   |        |    |
| U.S.R.-2½-3...              | 3            | 24           | M     | 10              | 1 1/4          | 10                     | 1 1/4  | 35           | F       | 50 1/2 | 2 1/2     | 1/8    | 4         | 41 1/2        | 2 1/2   |        |    |
| U.S.S.-3½-4...              | 3            | 24           | M     | 9               | 1 1/4          | 8                      | 1 1/4  | 37           | F       | 54 1/2 | 2 1/2     | 1/8    | 2         | 52 1/2        | 2 1/2   |        |    |
| U.S.T.-5-6...               | 4            | 16           | 1 1/2 | V               | 15             | 2                      | 13     | 1 1/4        | 38 1/2  | F      | 62        | 3      | 1/8       | 4             | 33      | 4 1/2  |    |
| U.S.U.-1½...                | 4            | 16           | 1 1/2 | V               | 11 1/2         | 1 1/4                  | 33     | 1 1/4        | 50 1/2  | F      | 10 1/2    | 2 1/2  | 1/8       | 2             | 120     | 34     |    |
| Velie 46-1½...              | 3            | 24           | M     | 9               | 1 1/4          | 12                     | 1 1/4  | 41 1/2       | F       | 54 1/2 | 2 1/2     | 1/8    | 2         | 120           | 31      |        |    |
| Velie 53-2½...              | 3            | 24           | M     | 5 1/2           | 1 1/8          | 12 1/2                 | 1 1/4  | 40 1/2       | F       | 54 1/2 | 2 1/2     | 1/8    | 2         | 120           | 31      |        |    |
| Vim 50-1½-2½...             | 3            | 24           | 1     | V               | 33 1/2         | 1 1/4                  | 48     | 1 1/4        | 46 1/2  | F      | 43        | 2 1/2  | 1/8       | 2             | 90      | 32     |    |
| Walker M2...                | ...          | ...          | ...   | ...             | ...            | ...                    | ...    | ...          | ...     | ...    | 53 1/2    | 3      | 1/8       | 4             | 140     | 35     |    |
| Walker P3½...               | ...          | ...          | ...   | ...             | ...            | ...                    | ...    | ...          | ...     | ...    | 53 1/2    | 3      | 1/8       | 4             | 162     | 35     |    |
| Walker N5...                | ...          | ...          | ...   | ...             | ...            | ...                    | ...    | ...          | ...     | ...    | 45 1/2    | 2 1/2  | 1/8       | 4             | 99      | 32     |    |
| Walker 22...                | ...          | ...          | ...   | ...             | ...            | ...                    | ...    | ...          | ...     | ...    | 53 1/2    | 3      | 1/8       | 4             | 120     | 32     |    |
| Walker 42...                | ...          | ...          | ...   | ...             | ...            | ...                    | ...    | ...          | ...     | ...    | 45 1/2    | 2 1/2  | 1/8       | 4             | 117     | 32     |    |
| Walker Johnson A-2...       | 3            | 16           | 1     | V               | 11 1/2         | 2                      | 7 1/2  | 1 1/4        | 37      | F      | 12        | 3 1/2  | 1/8       | 4             | 13      | 3 1/2  |    |
| Walker Johnson B3...        | 4            | 16           | 1 1/2 | V               | 10             | 2                      | 8      | 1 1/4        | 33 1/2  | F      | 13        | 3 1/2  | 1/8       | 4             | 13      | 3 1/2  |    |
| Walter 8-5...               | 3            | 24           | 2     | V               | 10             | 1 1/4                  | 18     | 1 1/4        | 39      | F      | 15        | 5      | 1/8       | 4             | 57      | 13 1/2 |    |
| Ward LaFrance 2B-2½-3½...   | 3            | 24           | 1 1/2 | V               | 7              | 1 1/4                  | 16     | 1 1/4        | 41 1/2  | F      | 13        | 3 1/2  | 1/8       | 4             | 137 1/2 | 33     |    |
| Ward LaFrance 4A-3½-5...    | 3            | 24           | 1 1/2 | V               | 8 1/2          | 1 1/4                  | 18     | 1 1/4        | 41 1/2  | F      | 15 1/2    | 3 1/2  | 1/8       | 4             | 15 1/2  | 3 1/2  |    |
| Ward LaFrance 5A-5-7...     | 3            | 24           | 1 1/2 | V               | 9 1/2          | 1 1/4                  | 18     | 1 1/4        | 41 1/2  | F      | 18        | 4      | 1/8       | 4             | 170 1/2 | 37     |    |
| Watson D-1...               | 3            | 24           | 1     | V               | 12 1/2         | 1 1/4                  | 12     | 1 1/4        | 40      | F      | 10 1/2    | 2 1/2  | 1/8       | 4             | 10 1/2  | 2 1/2  |    |
| Watson N-3½...              | 3            | 24           | 1 1/2 | V               | 16 1/2         | 1 1/4                  | 3      | 1 1/4        | 38 1/2  | F      | 62        | 2 1/2  | 1/8       | 2             | 47      | 2 1/2  |    |
| Watson U-5...               | 3            | 24           | 1 1/2 | V               | 16 1/2         | 1 1/4                  | 3      | 1 1/4        | 38 1/2  | F      | 15 1/2    | 3 1/2  | 1/8       | 2             | 15 1/2  | 3 1/2  |    |
| White 15-A Taxi...          | 3            | 16           | 1 1/2 | V               | 7 1/2          | 1                      | 6 1/2  | 1 1/4        | 38      | F      | 46        | 2 1/2  | 1/8       | 2             | 41 1/2  | 2 1/2  |    |
| White 15-15...              | 3            | 16           | 1 1/2 | V               | 7 1/2          | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 53 1/2    | 2 1/2  | 1/8       | 2             | 50 1/2  | 2 1/2  |    |
| White 15-45, 34...          | 3            | 16           | 1 1/2 | V               | 7 1/2          | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 55 1/2    | 3 1/2  | 1/8       | 2             | 55 1/2  | 3 1/2  |    |
| White 20-2...               | 3            | 16           | 1 1/2 | V               | 7 1/2          | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 55 1/2    | 3 1/2  | 1/8       | 2             | 85 1/2  | 3 1/2  |    |
| White 20-45, 2...           | 3            | 16           | 1 1/2 | V               | 13 1/2         | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 55 1/2    | 3 1/2  | 1/8       | 2             | 146     | 34     |    |
| White 50, Bus...            | 3            | 16           | 1 1/2 | V               | 13 1/2         | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 11 1/2    | 4      | 1/8       | 4             | 50 1/2  | 3 1/2  |    |
| White 40, 3½-45, 5...       | 3            | 16           | 1 1/2 | V               | 13 1/2         | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 11 1/2    | 4      | 1/8       | 4             | 25 1/2  | 5      |    |
| White 40-D, 3½-45-D, 5...   | 3            | 16           | 1 1/2 | V               | 13 1/2         | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 11 1/2    | 4      | 1/8       | 4             | 44 1/2  | 5      |    |
| Wichita K-1...              | 3            | 24           | 1 1/2 | V               | 18 1/2         | 1 1/2                  | 12     | 1 1/4        | 52 1/2  | F      | 19 1/2    | 2      | 1/8       | 4             | 19 1/2  | 2      |    |
| Wichita M-2...              | 3            | 24           | 1 1/2 | V               | 18 1/2         | 1 1/2                  | 12     | 1 1/4        | 52 1/2  | F      | 49        | 2      | 1/8       | 2             | 49      | 2      |    |
| Wichita RX-3...             | 3            | 24           | 1 1/2 | V               | 11             | 1 1/2                  | 11     | 1 1/4        | 43 1/2  | F      | 54        | 2 1/2  | 1/8       | 2             | 56 1/2  | 2 1/2  |    |
| Wichita O-4...              | 3            | 24           | 1 1/2 | V               | 11             | 1 1/2                  | 11     | 1 1/4        | 40      | F      | 66        | 3      | 1/8       | 2             | 66      | 3      |    |
| Wichita S-5...              | 3            | 24           | 1 1/2 | V               | 11             | 1 1/2                  | 11     | 1 1/4        | 40      | F      | 47 1/2    | 2 1/2  | 1/8       | 2             | 33 1/2  | 2 1/2  |    |
| Wilcox AA-1...              | 3            | 24           | 1     | V               | 11             | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 47 1/2    | 2 1/2  | 1/8       | 2             | 96      | 34     |    |
| Wilcox B-1½...              | 3            | 24           | 1     | V               | 11             | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 57 1/2    | 2 1/2  | 1/8       | 2             | 127 1/2 | 30     |    |
| Wilcox C-2½...              | 3            | 24           | 1     | V               | 11             | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 57 1/2    | 2 1/2  | 1/8       | 2             | 126 1/2 | 30     |    |
| Wilcox E-3½...              | 3            | 24           | 1     | V               | 11             | 1 1/2                  | 12     | 1 1/4        | 42 1/2  | F      | 69 1/2    | 3 1/2  | 1/8       | 2             | 148 1/2 | 36     |    |
| Wilcox F-5...               | 3            | 24           | 1 1/2 | 1               | V              | 11                     | 1 1/2  | 12           | 1 1/4   | 42 1/2 | F         | 13 1/2 | 3 1/2     | 1/8           | 2       | 120    | 33 |
| Wilson 1½...                | 4            | 16           | 1     | V               | 12             | 1 1/2                  | 14     | 1 1/4        | 48      | F      | 13 1/2    | 3 1/2  | 1/8       | 2             | 45 1/2  | 3 1/2  |    |
| Wilson 2½...                | 4            | 16           | 1     | V               | 12             | 1 1/2                  | 14     | 1 1/2        | 48      | F      | 42        | 2      | 1/8       | 2             | 24      | 2      |    |
| Wilson 3½...                | 4            | 16           | 1     | V               | 12             | 1 1/2                  | 14     | 1 1/2        | 48      | F      | 50        | 2 1/2  | 1/8       | 2             | 22 1/2  | 2 1/2  |    |
| Wilson 5...                 | 4            | 16           | 1     | V               | 12             | 1 1/2                  | 14     | 1 1/2        | 48      | F      | 52        | 3      | 1/8       | 2             | 22 1/2  | 2 1/2  |    |
| Winter & Hirsch K-2½...     | 4            | 16           | 1 1/2 | V               | 12             | 1 1/2                  | 14     | 1 1/2        | 48      | F      | 13 1/2    | 3 1/2  | 1/8       | 2             | 144     | 32     |    |
| Winter & Hirsch L-3½...     | 4            | 16           | 1 1/2 | V               | 12             | 1 1/2                  | 14     | 1 1/2        | 48      | F      | 13 1/2    | 3 1/2  | 1/8       | 2             | 196     | 36     |    |
| Winther 751-1...            | 3            | 24           | 1     | H               | 15 1/2         | 2                      | 17     | 2            | 36      | F      | 42        | 2      | 1/8       | 2             | 102     | 30     |    |
| Winther 39-1½...            | 3            | 24           | 1     | V               | 10             | 1 1/4                  | 4 1/2  | 1 1/4        | 33 1/2  | F      | 50        | 2 1/2  | 1/8       | 2             | 120     | 30     |    |
| Winther 430-1½...           | 3            | 24           | 1     | V               | 11 1/2         | 1 1/4                  | 11 1/2 | 1 1/4        | 30 1/2  | F      | 50        | 2 1/2  | 1/8       | 2             | 120     | 30     |    |
| Winther 450 2½...           | 3            | 24           | 1     | V               | 11 1/2         | 1 1/4                  | 6 1/2  | 1 1/4        | 37 1/2  | F      | 52        | 3      | 1/8       | 2             | 120     | 30     |    |
| Winther 51-2½...            | 3            | 24           | 1     | V               | 17 1/2         | 1 1/4                  | 8      | 1 1/4        | 42 1/2  | F      | 52        | 3      | 1/8       | 2             | 144     | 33     |    |
| Winther 70-3½...            | 3            | 24           | 1     | V               | 17 1/2         | 1 1/4                  | 8      | 1 1/4        | 42 1/2  | F      | 62        | 3      | 1/8       | 2             | 60      | 33     |    |
| Winther 109-5...            | 3            | 24           | 1     | V               | 21 1/2         | 1 1/4                  | 6      | 1 1/4        | 42 1/2  | F      | 93        | 2 1/2  | 1/8       | 2             | 93      | 2 1/2  |    |
| Winther 140-7...            | 3            | 24           | 1     | V               | 12             | 1 1/4                  | 6      | 1 1/4        | 42 1/2  | F      | 93        | 2 1/2  | 1/8       | 2             | 93      | 2 1/2  |    |
| Wisconsin 2 (Loganville)... | 3            | 24           | 1 1/2 | H               | 17             | 2                      | 17     | 2            | 34      | F      | 58        | 2 1/2  | 1/8       | 2             | 56 1/2  |        |    |

## KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

## Engine:

Beav—Beaver  
Buda  
Cont—Continental  
GBS—Golden, Belknap &  
Gr-B—Gray-Beal [Swartz  
Her—Hercules  
Hin—Hinkley  
H-Sp—Herschell-Spillman  
LeR—Le Roi  
Lib—Liberty  
LMF—Light Mfg. & Fdy.  
Lyco—Lycoming  
Mid—Midwest  
Sup—Supreme  
Wau—Waukesha  
Wei—Weidely  
Wis—Wisconsin

## Valve Arrangement:

H—Overhead  
L—ELL-Head  
S—Sleeve  
T—TEE-Head

## How Cooled:

A—Air  
B—Pump & Thermo  
C—Centrifugal  
G—Gear Pump  
T—Thermo-Syphon

## Radiator (Make):

BW—B & W  
Brm—Brenem  
Bus—Bush  
Can—Candler  
Chic—Chicago  
Eag—Eagle  
EM—English-Mersick  
Eur—Eureka  
Fed—Fedders  
Flex—Flexo  
GO—G. & O.  
Har—Harrison  
Hoo—Hooven  
Idl—Ideal  
Jam—Jamestown  
Kue—Kuenz  
Liv—Livingston  
Lng—Long  
McC—McCord  
May—Mayo  
Mod—Modine  
Per—Perfex  
R-T—Rome-Turney  
Spar—Sparton  
Spec—Special  
Spli—Splitex  
Stn—Standard  
Whe—Wheeler

## Radiator (Type):

C—Cellular  
5 Fin—Fin Tube  
H—Honeycomb  
PT—Plain Tube  
ZZT—Zig Zag Tube

## Lubrication:

6 FS—Force and Splash  
F—Force Feed  
S—Splash

## Carburetor:

Bent—Bennett  
Cart—Carter  
Eag—Eagle  
En—Ensign  
Hol—Holly  
John—Johnson  
King—Kingston

Mar—Marvel  
Mas—Master  
Mill—Miller  
Rayf—Rayfield  
Scoe—Scoe  
Strm—Stromberg  
Sheb—Schebler  
Stew—Stewart  
Till—Tillotson  
Zen—Zenith

## Fuel Feed:

G—Gravity  
8 P—Pressure  
V—Vacuum

## Governor:

Con—Continental  
Dup—Duplex  
Han—Handy  
Her—Hercules  
Hin—Hinkley  
McC—McCanna  
Mon—Monarch  
Phar—Pharo  
Pier—Pierce  
Sim—Simplex  
Wau—Waukesha

## Clutch (Make):

B.B—Borg & Beck  
B-Li—Brown-Lipe  
Covt—Covert  
Det—Detlaff  
DG—Detroit Gear & Mach.  
Full—Fuller  
Hart—Hartford  
Hoos—Hoosier  
HS—Hele-Shaw  
M-E—Merchant & Evans  
Mun—Muncie  
T-D—Twin Disc  
W-Gr—Warner Gear

## Clutch (Type):

C—Cone  
D—Disc  
11 DD—Dry Disc  
Fr—Friction  
WP—Wet Plate

## Ignition System:

Amr—American Swiss  
Apo—Apollo  
AtK—Atwater Kent  
AuL—Auto-Lite  
Ber—Berling  
Bos—Bosch  
Con—Connecticut  
Del—Delco  
Eis—Eisemann  
Kin—Kingston  
12 KW—K. W. Ignition Co.  
Lor—Louraine  
NE—North East  
POL—Prest-O-Lite  
Rm—Remy  
RBo—Robert Bosch  
Sim—Simms  
Spl—Splidorf  
Tea—Teagle  
Wag—Wagner  
Wes—Westinghouse

## Engine Starter:

AC—Allis-Chalmers  
AK—Atwater Kent  
AL—Auto-Lite  
13 Bj—Bijur  
Bos—Bosch  
DL—Delco  
Dy—Dyneto  
GD—Gray & Davis

LN—Leece-Neville  
NE—North East  
Rm—Remy  
USL—U. S. L.  
W—Westinghouse  
Wg—Wagner

## Gearset:

B-Li—Brown-Lipe  
Cott—Cotta  
Covt—Covert  
Det—Detroit  
Dun—Dundore  
Durs—Durston  
Full—Fuller  
G-Le—Grant Lees  
MM—Mechanics Mach. Co.  
Mun—Muncie  
W-C—Warner Corporation  
W-Gr—Warner Gear

## Location of Gearset:

A—Midships  
J—Unit with jackshaft  
15 R—Rear  
U—Unit with engine

## Universal:

Acm—Acme  
Ary—Arvac  
Bld—Blood-Brothers  
Det—Detroit  
Hart—Hartford  
KB—Kinsler-Bennett  
MM—Mechanics  
M-E—Merchant & Evans  
Nor—Norwalk  
Pet—Peters  
Sned—Snead  
Spic—Spicer  
Ster—Sterling  
Ther—Thermod  
UM—Universal Machine  
UP—Universal Products  
Var—Varied

## Springs:

Am—Am. Auto Parts  
Arm—Armstrong  
Cham—Champion  
Del—Delany  
Det—Detroit  
GC—Garden City  
Har—Harvey  
IC—Iron City  
Kal—Kalamazoo  
Lah—Laher  
Lig—Liggett  
Mar—Maremont  
Math—Mather  
Mer—Merrill  
Nat—National  
Pen—Penn  
Per—Perfection  
Row—Rowland  
Shel—Sheldon  
SP—Spring Perch  
Stan—Stan-Par  
SS—Standard Steel  
Ster—Sterling  
Tut—Tuthill  
US—United States  
Vul—Jenkins Vulcan

## Final Drive:

B—Bevel Gear  
C—Chain  
I—Internal Gear  
P—Spur  
R—Double Reduction  
S—Spiral Bevel  
W—Worm

## Rear Axle (Make):

Col—Columbia  
Clark  
Dun—Dunkirk  
Eat—Eaton  
Fli—Flint  
Huck—Huck  
IrM—Iron Mt.  
LM—L M Axle  
Russ—Russel  
Sals—Salisbury  
Shel—Sheldon  
Stn—Standard Parts  
Thom—Thomson  
Tim—Timken  
Torb—Torbensen  
Vul—Vulcan  
Walk—Walker  
Wis—Wisconsin

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Rear Axle (Type):  
Flot—Floating  
D—Dead  
1/2-Fl—Semi-Floating  
3/4-Fl—3/4-Floating

## Steering Gear:

CAS—C. A. S. Products Co.  
Dit—Ditwiler  
Gem—Gemmer  
Jac—Jacox  
21 Lav—Lavine  
M-P—Muncie Products  
Ros—Ross  
Sag—Saginaw Products Co.  
Woh—Wohlrab

## Wheels:

Arc—Archibald  
AuW—Auto Wheel  
Bim—Bimel  
Bud—Budd  
Cla—Clark  
C&M—Crane & McMahon  
Day—Dayton  
Det—Detroit  
Dis—Disteel  
E&O—Eberly & Oris  
Hay—Hayes  
Hoo—Hoopes Brothers  
Imp—Imperial  
Jon—Jones  
Kel—Kelsey  
MM—Michigan Malleable  
Iron Co.  
Mot—Motor Wheel  
Mun—Muncie Wheel  
Mut—Mutual  
Nor—Northern  
Pru—Prudden  
Roy—Royer  
Sch—Schwartz  
Smi—Smith  
Sta—Stanwell  
StM—St. Mary  
Stn—Standard  
Wal—Walker  
Way—Wayne  
W-L—Waterhouse & Lester

## Rim Equipment:

Bak—Baker  
Cle—Cleveland  
Det—Detroit  
Fir—Firestone  
Gdy—Goodyear  
Hay—Hayes  
Jac—Jackson  
Jax—Jaxon  
Kel—Kelsey  
Mil—Miller

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|                                  |      |             |         |      |     |               |          |     |
|----------------------------------|------|-------------|---------|------|-----|---------------|----------|-----|
| *Independent B (Iowa).....       | 1665 | Cont N      | Wau BUX | 3480 | 135 | Stm Fir       | 3200     | 130 |
| Indiana Highway Express.....     | 1250 | Lyco-In't'l | Wau BUX | 3200 | 124 | Opt           | 2750     | 115 |
| International Speed Truck S..... | 1550 | Own         | Wau BUX | 3030 | 115 | Own           | 2000     | 118 |
| *International 21.....           | 1550 | H-Sp 7000   | Wau BUX | 3200 | 102 | Stm Sch       | 3700     | 102 |
| *Kearny H. Express.....          | 1585 | Own 8000    | Wau BUX | 3200 | 138 | 32x1 1/2* Sch | 34x3 1/2 | 138 |
| Kiesel Express.....              | 1585 | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Kiebler A.A.....                | 1865 | Cont J-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Larabee-Devo-Y. X-2.....        | 1865 | Cont R-7    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Luedinghaus C.....               | 1695 | H-Sp 7000   | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Mason Road Kington.....          | 1695 | Her O       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Menominee Hurton.....            | 1595 | Wis U       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Moreland R.R.....                | 1595 | Her O       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Napoleon 9.....                  | 1595 | Gr-B        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Nash 2018.....                   | 1595 | Own 4       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Nelson-LeMoon G-1.....          | 1865 | Cont J-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Noble A.75.....                  | 1650 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| O.K. 1 Ton.....                  | 1695 | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Oldmano.....                     | 1875 | Wau BUX     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Parker C22.....                  | 1685 | Lyco KB     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Sohwarts A.....                  | 1685 | Cont J-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Signal NF.....                  | 1700 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Southern 10.....                | 1700 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Stoughton A.....                 | 1650 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Superior D.....                  | 1700 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Transport 15.....                | 1295 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Triangle AA.....                 | 1285 | H-Sp        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *United Highway Special.....     | 1895 | H-Sp        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Watson D.....                   | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Wichita K.....                   | 1875 | Wau BX      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Wilcox AA.....                  | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Wilson C.....                    | 1895 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Winter Delivery Special.....     | 1495 | H-Sp 7000   | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Wisconsin A (Sauk City).....    | 1750 | Cont        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Sandow W-10.....                 | 1695 | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Sanford W-10.....                | 1685 | Lyco KB     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Sohwarts A.....                  | 1685 | Cont J-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Signal NF.....                  | 1700 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Southern 10.....                | 1700 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Stoughton A.....                 | 1650 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Superior D.....                  | 1700 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Transport 15.....                | 1295 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Triangle AA.....                 | 1285 | H-Sp        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *United Highway Special.....     | 1895 | H-Sp        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Watson D.....                   | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Wichita K.....                   | 1875 | Wau BX      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Wilcox AA.....                  | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Wilson C.....                    | 1895 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Winter Delivery Special.....     | 1495 | H-Sp 7000   | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Wisconsin A (Sauk City).....    | 1750 | Cont        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Commerce T.....                  | 1890 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Denby 31.....                    | 1485 | Cont        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Dependable A.....                | 1750 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Diamond T-Q3.....               | 1875 | Hin         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Eagle 101.....                   | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Kearny N.....                    | 1650 | H-Sp 7000   | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Menominee HT.....                | 1700 | Wib CAU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Noble A.21.....                  | 1750 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Perfection B.....               | 1885 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Reo F Speedwagon.....           | 1885 | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Samson 25.....                   | 995  | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Service 75.....                 | 1330 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Standard 75.....                | 1245 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Stewart 15.....                  | 1445 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Thomasen Speed.....              | 1795 | Hin         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *U.S. U Cab M-2-1/2.....         | 1640 | Cont V-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| 1 1/4 Ton                        |      |             |         |      |     |               |          |     |
| Clydesdale 18.....               | 1890 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Commerce T.....                  | 1450 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Denby 31.....                    | 1485 | Cont        | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Dependable A.....                | 1750 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Diamond T-Q3.....               | 1875 | Hin         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Eagle 101.....                   | 1875 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Kearny N.....                    | 1650 | H-Sp 7000   | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Menominee HT.....                | 1700 | Wib CAU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Noble A.21.....                  | 1750 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Perfection B.....               | 1885 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Reo F Speedwagon.....           | 1885 | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Samson 25.....                   | 995  | Own         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Service 75.....                 | 1330 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Standard 75.....                | 1245 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Stewart 15.....                  | 1445 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Thomasen Speed.....              | 1795 | Hin         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *U.S. U Cab M-2-1/2.....         | 1640 | Cont V-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| 1 1/2 Ton                        |      |             |         |      |     |               |          |     |
| Aero 30.....                     | 1916 | Cont J-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Aero D.....                      | 2450 | Buda CTU    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Armeleider 2-1B.....            | 2450 | Buda CTU    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Armeleider 40B.....             | 2900 | Cont C-4    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Armeleider 40C.....             | 2460 | Her         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Aero B.1.....                    | 1950 | Buda CTU    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Aero B.2.....                    | 2200 | Own 2       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Autosar F.....                   | 2300 | Own 2       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Available H.....                | 2460 | Her         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Bell E.....                      | 2100 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Beaumont H2.....                | 1905 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Bridgeston A.....                | 2350 | Buda MU     | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Atterbury 20R.....               | 2475 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Autosar F.....                   | 2200 | Own 2       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Autosar F.....                  | 2300 | Own 2       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Bridgeston A.....               | 2460 | Her         | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Brookway S.....                 | 2750 | Wis SU-3    | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Buffalo Model 9.....            | 2750 | Her O       | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| *Chicago C.....                  | 2060 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Climber A-20.....                | 2385 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |
| Clydesdale 20.....               | 2385 | Cont N      | Wau BUX | 3200 | 130 | 32x1 1/2* Sch | 34x3 1/2 | 130 |

| Trade Name and Model   | Chassis Frame | Front Axle    | Rear Axle     | Tires, Wheels, Rims              |                |               |               |
|------------------------|---------------|---------------|---------------|----------------------------------|----------------|---------------|---------------|
|                        |               |               |               | • Pneumatic<br>• Dual<br>• Solid | • Tire<br>Size | • Rim<br>Size | • Wheel (Rim) |
| 1/2 Ton—Con'd          |               |               |               |                                  |                |               |               |
| Commerce 12            | 1800          | Cont N        | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | BJ            | 35x5          |
| Commerce A             | 3150          | Buda ITU      | 4 1/2 x 5 1/2 | 25.6 L                           | DD             | BJ            | 35x5          |
| Corbett D-22           | 3220          | Cont J-4      | 3 1/2 x 5     | 22.5 L                           | DD             | BJ            | 35x5          |
| Corbitt D-22           | 2800          | H-Sp 7000     | 3 1/2 x 5     | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Cyclone A              | 2600          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Day-Elder B            | 2180          | Buda WU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Dearborn F-X           | 2300          | Buda WU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Defiance D-X           | 2525          | Hin           | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Diamond T-Farm Spec.   | 2450          | H-Sp 7000     | 3 1/2 x 5 1/2 | 19.6 L                           | DD             | W-Gr          | 35x5          |
| D-Olt A                | 1750          | Buda WU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Douglas G              | 1750          | Wet           | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Federal S-22           | 2800          | Buda CTU      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Forscher C             | 2190          | Buda WU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Front Drive C.         | 3100          | Buda ITU      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Garfield 25 B          | 1325          | Dodge         | 3 1/2 x 4 1/2 | 24.1 L                           | DD             | W-Gr          | 35x5          |
| Geraix M.              | 1750          | Graham Bros.  | 3 1/2 x 4 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Gramm-Pioneer 15.      | 2250          | Cont J-4      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Gramm-Pioneer 65.      | 1885          | Cont N        | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| G.W. W. Farm Spec.     | 1350          | Buda WU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Hug. Hug.              | 1850          | Buda          | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Hurlburt ST.           | 2040          | Cont J.       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Independent G (Iowa)   | 1650          | Wau BUX       | 3 1/2 x 5 1/2 | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Indiana 12.            | 1800          | Cont N        | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| International 31.      | 2645          | Wau EAU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Kalamazoo LG.          | 2700          | Own AB        | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Kelly-Springfield K34. | 1875          | Own 40000     | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Kissel General Utility | 2150          | Cont K-4      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Kleiber A.             | 2665          | Wau BUX       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Koehler D.             | 2490          | Wau BUX       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Larabee W.             | 2475          | Cont K-4      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Luedinghaus W.         | 3000          | Cont K-4      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Macar L2.              | 3450          | Own AB        | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Mack AB.               | 2290          | Buda AB       | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Master J.W.            | 2835          | Buda OU       | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Master J.D.            | 2830          | Buda OU       | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Maxwell.               | 2865          | Buda OU       | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Menominee H.           | 1695          | Wau EAU       | 3 1/2 x 5     | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Moline 10.             | 1980          | Her O         | 3 1/2 x 5     | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Moteland BX.           | 1860          | Gr-B          | 3 1/2 x 5     | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Napoleon II.           | 3150          | Master J.W.   | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Nelson-LeMoon G-2.     | 2350          | Lyco K.       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Ogden D.               | 2400          | Cont N        | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| O.K.                   | 2250          | Buda ITU      | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Old Reliable A.        | 1950          | Wau EU        | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Paige 52-19.           | 3000          | Wau           | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Pittsburgher A.        | 1795          | Buda CTU      | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Power F.               | 1795          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Premoar                | 2250          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Rainer 26.             | 2400          | Cont L4       | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Reliance 10A.          | 2250          | Buda ITU      | 4 x 5         | 25.6 L                           | DD             | W-Gr          | 35x5          |
| Republ 11X.            | 1795          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Rowe CW.               | 3000          | Wau CAU       | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Rumely A.              | 1790          | Buda          | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Sandow.                | 1795          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Sanford W-15           | 2150          | Sedan Unit 30 | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Sherman                | 2250          | Buda RU       | 3 1/2 x 5 1/2 | 19.6 L                           | DD             | W-Gr          | 35x5          |
| Servic 21.             | 2100          | Cont C-4      | 4 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Signal H.              | 2690          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Southern 1/2 K.        | 1695          | Wau           | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Sterling.              | 2885          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Stewart 9.             | 1790          | Cont N        | 3 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Stoughton B.           | 2150          | Wau BUX       | 4 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Tiffin G.              | 2175          | Cont C-4      | 4 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Traffic-Specboy.       | 1495          | Cont N-4      | 4 1/2 x 5     | 22.5 L                           | DD             | W-Gr          | 35x5          |
| Transport 250.         | 2150          | Buda          | 3 1/2 x 5 1/2 | 22.5 L                           | DD             | W-Gr          | 35x5          |

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| Trade Name<br>and Model   |  | Chassis Price |  | ENGINE DETAILS    |               |                        |               |                   |   |                  |   |           |     | TIRES, WHEELS, RIMS |    |                 |      |                |     |                 |      |        |       |         |       |                 |      |                 |      |      |      |           |     |       |  |               |  |
|---------------------------|--|---------------|--|-------------------|---------------|------------------------|---------------|-------------------|---|------------------|---|-----------|-----|---------------------|----|-----------------|------|----------------|-----|-----------------|------|--------|-------|---------|-------|-----------------|------|-----------------|------|------|------|-----------|-----|-------|--|---------------|--|
|                           |  |               |  | Bore and Stroke   |               | N. A. C. C. Horsepower |               | Valve Arrangement |   | Radiator (Model) |   | Fuel Feed |     | Carburetor          |    | Ignition System |      | Engine Starter |     | Gearbox (Model) |      | Speeds |       | Loctite |       | Universal Joint |      | Springs (Model) |      | Type |      | REAR AXLE |     | Front |  | Rim Equipment |  |
| <b>Ton-Con'd</b>          |  | 4 1/2 x 5 1/2 |  | 28.9              | L             | B.B.                   | DD            | Pier              | V | Strm             | F | McC       | Fin | Full                | 4  | M-E             | Shel | W              | Tim | Shel            | W    | 16 FI  | 7     | 33.8    | 35x5* | 35x7*           | Bim  | Fir             | 4900 | 150  |      |           |     |       |  |               |  |
| Service 27...             |  | 2990          |  | Buda HU           | 4 1/2 x 5 1/2 | Buda HU                | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7       | 41.1  | 19              | Ros  | 36x4            | 40x8 | Pru  | Gay  | 5725      | 150 |       |  |               |  |
| Southern 20...            |  | 3085          |  | Wau               | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.66    | 46.3  | Ros             | 36x4 | 36x6            | Pru  | Gay  | 5725 | 142       |     |       |  |               |  |
| Sterling 2...             |  | 2490          |  | Her CU-3          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 9       | 23.2  | Ros             | 36x4 | 36x6            | Pru  | Gay  | 4800 | 140       |     |       |  |               |  |
| Soughton D...             |  | 2450          |  | Cont C-2          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 9       | 23.2  | Ros             | 36x4 | 36x6            | Pru  | Gay  | 3800 | 144       |     |       |  |               |  |
| Superior E...             |  | 2450          |  | Cont C-2          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 9       | 23.2  | Ros             | 36x4 | 36x6            | Pru  | Gay  | 3800 | 156       |     |       |  |               |  |
| Traffic 2000C...          |  | 1595          |  | Cont N-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.6     | 25.62 | Own             | 36x4 | 36x6            | Pru  | Gay  | 3717 | 132       |     |       |  |               |  |
| Transport 36...           |  | 1885          |  | Wau BUX           | 3 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 36.48 | Jac             | 36x3 | 36x7            | Pru  | Opt  | 4000 | 156       |     |       |  |               |  |
| Traylor C...              |  | 2285          |  | Wau BUX           | 3 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 9.1     | 36.7  | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 146       |     |       |  |               |  |
| Triangle C...             |  | 2550          |  | Triumph 2         | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 9.1     | 36.7  | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 144       |     |       |  |               |  |
| Twin City...              |  | 2400          |  | Ultimate A.J...   | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Ultimate A.J...           |  | 3250          |  | Ultimate A.J.L... | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Walker N...               |  | 2500          |  | Wau BUX           | 3 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| White 20...               |  | 3250          |  | Own               | 3 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Wichita, M...             |  | 2400          |  | Wau BX            | 3 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Wisconsin (Loganville)... |  | 1450          |  | W-HSP-7000        | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Witt Will P...            |  | 2900          |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 8.75    | 32.03 | Ros             | 36x4 | 36x7            | Pru  | Opt  | 4000 | 140       |     |       |  |               |  |
| Wau CU                    |  | 4 1/2 x 5 1/2 |  | Buda HU           | 4 1/2 x 5 1/2 | Buda HU                | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 5400 | 160       |     |       |  |               |  |
| Buda HU                   |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HU                | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 5630 | 166       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4500 | 148       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  | 4830 | 162       |     |       |  |               |  |
| Buda HTU                  |  | 4 1/2 x 5 1/2 |  | Cont C-4          | 4 1/2 x 5 1/2 | Buda HTU               | 4 1/2 x 5 1/2 | Pier              | V | Strm             | F | Own       | PT  | Own                 | PT | 4               | 4    | Shel           | W   | Tim             | Shel | W      | 16 FI | 7.75    | 40.3  | Ros             | 36x4 | 36x7            | Sch  | Opt  |      |           |     |       |  |               |  |

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| Trade Name<br>and Model      |      | Chassis Type |        | Engine Details |      | Gearbox (Type) |      | Locomotion |      | Gearset |       | Rear Axle |       | Tires, Wheels, Rims |      | Chassis Weight<br>(Gross Popped) |          |
|------------------------------|------|--------------|--------|----------------|------|----------------|------|------------|------|---------|-------|-----------|-------|---------------------|------|----------------------------------|----------|
|                              |      |              |        |                |      |                |      |            |      |         |       |           |       |                     |      |                                  |          |
| Front                        | Rear | Front        | Rear   | Front          | Rear | Front          | Rear | Front      | Rear | Front   | Rear  | Front     | Rear  | Front               | Rear | Front                            | Rear     |
| <b>3½ Ton</b>                |      |              |        |                |      |                |      |            |      |         |       |           |       |                     |      |                                  |          |
| Acacon L. ....               | 3075 | Wau C.U.     | 30 6 L | G              | C    | Eis            | Opt  | Det        | W    | Tim     | Flot  | 8.75      | 48.5  | Ros                 | 36x5 | Smi                              | 7000 180 |
| Apex F. ....                 | 4200 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Full       | W    | Turb    | D     | 10.33     | 55.25 | Woh                 | 36x5 | Opt                              | 6840 168 |
| *Armedier K.W.C. ....        | 4200 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 55.25     | Ros   | 36x5                | Smi  | 6800 156                         |          |
| Attelbury K.W.C. ....        | 4200 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 55.25     | Ros   | 36x5                | Smi  | 6800 156                         |          |
| Attelbury 22DX Short. ....   | 4275 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 55.25     | Gem   | 36x5                | Opt  | 7500 160                         |          |
| Attelbury 22DX Std. ....     | 4275 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 55.25     | Gem   | 36x5                | Opt  | 7500 174                         |          |
| Attelbury 22DX L.W.B. ....   | 4275 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 55.25     | Gem   | 36x5                | Opt  | 7500 198                         |          |
| Autocar Y. ....              | 4200 | Own Y.       | 32 4 L | G              | GO   | D              | Full | Phar       | Own  | Tim     | Flot  | 8.7       | 52.3  | Ros                 | 34x6 | Opt                              | 7200 120 |
| *Available H. ....           | 4175 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Own  | Tim     | Flot  | 10.33     | 59.99 | Ros                 | 36x5 | Opt                              | 6800 120 |
| Bridgeport 4C. ....          | 3990 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.25  | 52.3      | Ion   | 36x5                | Opt  | 10500 176                        |          |
| Brookway R. ....             | 3990 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 56.8      | Gem   | 36x5                | Opt  | 6800 164                         |          |
| *Chicago C. ....             | 3130 | Her M.U.3    | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.33  | 50.0      | Gem   | 36x5                | Opt  | 7200 168                         |          |
| Day Eider F. ....            | 3130 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 5800 165                         |          |
| Dependable G. ....           | 3360 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.8   | 44.36     | Gem   | 36x5                | Opt  | 6000 165                         |          |
| Diamond T.K. ....            | 3750 | Hin          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 7250 170                         |          |
| Dixon K. ....                | 4400 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Ros   | 36x5                | Opt  | 6650 160                         |          |
| Duplex E. ....               | 3560 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 51.5      | Ros   | 36x5                | Opt  | 6750 194                         |          |
| *Gary K.T. ....              | 3130 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.25  | 56.8      | Gem   | 36x5                | Opt  | 6800 164                         |          |
| Giant 17. ....               | 4150 | Her M.U.3    | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 5800 165                         |          |
| *G. M. C. K-71A. ....        | 4150 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 46.8      | Gem   | 36x5                | Opt  | 7250 176                         |          |
| *G. M. C. K-71B. ....        | 4150 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 5800 176                         |          |
| *G. M. C. K-71T. ....        | 4150 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 46.8      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| *Gramma Pioneer 75P. ....    | 4225 | Hin H.A. 200 | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.5   | 45        | Ros   | 36x5                | Opt  | 6000 160                         |          |
| *Hal-Fur B. ....             | 3000 | Hin H.A. 500 | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 7.75  | 57.4      | Gem   | 36x5                | Opt  | 6500 160                         |          |
| *Hal-Fur F. ....             | 4000 | Hin H.A. 600 | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6500 160                         |          |
| *Hal-Fur P. ....             | 3000 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 6500 160                         |          |
| *Harvey WHB. ....            | 3650 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 46.8      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| *Hendrickson M. ....         | 3150 | Buda E.B.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.25 | 51.61     | Gem   | 36x5                | Opt  | 7200 160                         |          |
| *Hurlburt C.C. ....          | 3150 | Buda H.U.    | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6600 170                         |          |
| Indiana 35. ....             | 3150 | Own 40       | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.71     | Ros   | 36x5                | Opt  | 7050 160                         |          |
| Jackson B. ....              | 3845 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.2   | 43.49     | Ros   | 36x5                | Opt  | 6500 160                         |          |
| *Kell-Kanso S.K. ....        | 3845 | Wis U.A.U.   | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 7.5   | 45.55     | Ros   | 36x5                | Opt  | 7250 160                         |          |
| Kelly-Springfield K-40. .... | 3900 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Kelly-Springfield K-41. .... | 3900 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Kelly-Springfield K-42. .... | 3900 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Kleiber C. ....              | 3150 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6600 165                         |          |
| Koehler F. ....              | 4470 | Her          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.71     | Ros   | 36x5                | Opt  | 7000 162                         |          |
| Koehler F. ....              | 4470 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 9.25  | 55.55     | Ros   | 36x5                | Opt  | 7000 160                         |          |
| Larkspur L4. ....            | 3845 | Wis U.A.U.   | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 7.5   | 48.37     | Ros   | 36x5                | Opt  | 6000 165                         |          |
| Mack AC. ....                | 4150 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Master A. ....               | 3845 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| Master B. ....               | 4150 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Master E. ....               | 4150 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Master EL. ....              | 4150 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Menominee G. ....            | 3800 | Wis V.A.U.   | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6500 160                         |          |
| Noble E-71. ....             | 3485 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Northway B3. ....            | 4200 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6500 160                         |          |
| O.K. F. ....                 | 3975 | Cont L-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| *Old Reliable C. ....        | 4230 | Buda Y.T.U.  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Oneida D. ....               | 4050 | Hin 200      | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Packard ED. ....             | 4150 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Pale 51-18. ....             | 3145 | Hin 200      | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Parke J-20. ....             | 3270 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Perfection E. ....           | 2975 | Cont K-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Pierce Arrow W2. ....        | 4350 | Own          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Pittsburgher D. ....         | 3800 | Hin H.A.200  | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| Power C. ....                | 4150 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Rainier R-15. ....           | 4400 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| *Republic 20. ....           | 3095 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| *Sandow 3895                 | 3895 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 7250 160                         |          |
| *Sandford W-35B              | 3750 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| *Sandford W-35D              | 3750 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| Selden Unit 70. ....         | 4350 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Selden Unit 51. ....         | 4350 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| Service 72. ....             | 3750 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| *Signal M. ....              | 3845 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| *Standard 3½ K. ....         | 3845 | Cont E-4     | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| Standard 3½ K. ....          | 4325 | Wau          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                | Opt  | 6800 165                         |          |
| Stewart 10X. ....            | 3190 | Wau          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 8.75  | 42.35     | Ros   | 36x5                | Opt  | 6800 165                         |          |
| *Super Truck 70. ....        | 4100 | Wau          | 32 4 L | G              | GO   | D              | Full | Phar       | Tim  | Flot    | 10.33 | 51.5      | Gem   | 36x5                |      |                                  |          |

Tom

\*Steffan F36  
Steffan.....  
Tower G.....  
Transport 61  
Twin City.....  
United C.....  
Ward La Fr.....  
Watson N.....  
White 40.....  
Wichita O.....  
Wilcox E.....  
Wilson G.....  
Winter & Hi.....  
Winter 70.....  
Wisconsin D.....



## ELECTRIC COMMERCIAL CARS

| E. C. M                    | Carrying Capacity | Chassis Weight | Chassis Price | Maximum Speed    | Battery          | Mileage Per Charge | Motor | Controller | Speeds Forward | Drive | Rear Axle          | Spring             | Front Tires        | Rear Tires | Steering Gear    | Wheelbase | Per Cent of Weight on Rear Wheels |
|----------------------------|-------------------|----------------|---------------|------------------|------------------|--------------------|-------|------------|----------------|-------|--------------------|--------------------|--------------------|------------|------------------|-----------|-----------------------------------|
| Atlantic 1C                | 2000              | 2770           | ...           | 12               | Opt              | ...                | G-E   | G-E        | ...            | Timk  | S-El               | 34x4               | 36x4               | Ross       | 193              | 65        |                                   |
| Atlantic 2C                | 4000              | 3590           | ...           | 11               | Opt              | ...                | G-E   | G-E        | ...            | Timk  | S-El               | 34x4               | 36x3 $\frac{1}{2}$ | Ross       | 115              | 65        |                                   |
| Atlantic 3C                | 7000              | 5220           | ...           | 10               | Opt              | ...                | G-E   | G-E        | ...            | Timk  | S-El               | 36x5               | 40x5 $\frac{1}{2}$ | Ross       | 135              | 65        |                                   |
| Atlantic 5C                | 10000             | 6230           | ...           | 9                | Opt              | ...                | G-E   | G-E        | ...            | Timk  | S-El               | 36x6               | 40x5 $\frac{1}{2}$ | Ross       | 144              | 65        |                                   |
| Atlantic 6C                | 13000             | 6940           | ...           | 8                | Opt              | ...                | G-E   | G-E        | ...            | Timk  | S-El               | 36x6               | 40x6               | Ross       | 156              | 65        |                                   |
| C-T D-1                    | 1000              | 2200           | 1885          | 14               | Opt              | 55                 | G-E   | G-E        | ...            | C-T   | Flot               | 36x3               | 36x3 $\frac{1}{2}$ | W          | 100              | 69        |                                   |
| C-T B-1.5                  | 1500              | 2300           | 1985          | 14               | Opt              | 60                 | G-E   | Own        | 4              | C-T   | Flot               | 36x3               | 36x4               | W          | 91 $\frac{1}{2}$ | 65        |                                   |
| C-T D-1.5                  | 1500              | 2300           | 1985          | 14               | Opt              | 60                 | G-E   | Own        | 4              | C-T   | Flot               | 36x3               | 36x4               | W          | 116              | 71        |                                   |
| C-T B-2                    | 2000              | 2400           | 2150          | 14               | Opt              | 50                 | G-E   | Own        | 4              | C-T   | Flot               | 36x3 $\frac{1}{2}$ | 36x5               | W          | 101              | 66        |                                   |
| C-T D-2                    | 2000              | 2400           | 2150          | 14               | Opt              | 50                 | G-E   | Own        | 4              | C-T   | Flot               | 36x3 $\frac{1}{2}$ | 36x5               | W          | 124              | 70        |                                   |
| C-T B-4                    | 4000              | 4000           | 2575          | 12               | Opt              | 50                 | G-E   | Own        | 4              | C-T   | Flot               | 36x4               | 36x4 $\frac{1}{2}$ | W          | 116              | 68        |                                   |
| C-T C-6                    | 6000              | 4300           | 2850          | 10               | Opt              | 45                 | G-E   | Own        | 4              | I     | Dead               | 36x4               | 36x4 $\frac{1}{2}$ | W          | 122              | 70        |                                   |
| C-T C-7                    | 7000              | 5000           | 3550          | 10               | Opt              | 45                 | G-E   | Own        | 4              | I     | Dead               | 36x5               | 36x5 $\frac{1}{2}$ | W          | 126              | 65        |                                   |
| C-T A-7                    | 7000              | 5800           | 3850          | 11               | Opt              | 45                 | G-E   | Own        | 4              | I     | Dead               | 36x6               | 36x4 $\frac{1}{2}$ | W          | 122              | 60        |                                   |
| C-T A-10                   | 10000             | 6500           | 3960          | 10               | Opt              | 45                 | G-E   | Own        | 4              | I     | Dead               | 36x7               | 36x5 $\frac{1}{2}$ | W          | 132              | 59        |                                   |
| Kelland A                  | 1000              | 1850           | ...           | 15               | Opt              | 50                 | G-E   | G-E        | 4              | R     | Flot               | 34x3               | 34x3               | Ross       | 102              | 60        |                                   |
| Kelland B                  | 1500              | 1950           | ...           | 15               | Opt              | 50                 | G-E   | G-E        | 4              | R     | Flot               | 34x3 $\frac{1}{2}$ | 34x3 $\frac{1}{2}$ | Ross       | 102              | 60        |                                   |
| Kelland C                  | 2000              | 2150           | ...           | 15               | Opt              | 50                 | G-E   | G-E        | 4              | R     | Flot               | 34x3 $\frac{1}{2}$ | 34x4               | Ross       | 102              | 60        |                                   |
| Lansden BG 4               | 1400              | 1600           | 15            | Opt              | 50               | G-E                | G-E   | 4          | R              | Flot  | SP                 | 32x4 $\frac{1}{2}$ | 32x4 $\frac{1}{2}$ | Lav        | 108              | 50        |                                   |
| Lansden MC 1               | 2900              | 1850           | 12            | Opt              | 50               | G-E                | G-E   | 4          | R              | Flot  | SP                 | 36x3               | 36x3 $\frac{1}{2}$ | KH         | 108              | 60        |                                   |
| Lansden MD 2               | 4400              | 2250           | 11            | Opt              | 50               | G-E                | G-E   | 4          | R              | Flot  | SP                 | 36x4               | 36x3 $\frac{1}{2}$ | KH         | 120              | 60        |                                   |
| Lansden ME 3 $\frac{1}{2}$ | 5700              | 2950           | 10            | Opt              | 45               | G-E                | G-E   | 4          | R              | Flot  | SP                 | 36x5               | 36x4 $\frac{1}{2}$ | KH         | 133              | 60        |                                   |
| Lansden MF 5               | 7500              | 3350           | 9             | Opt              | 40               | G-E                | G-E   | 4          | R              | Flot  | SP                 | 36x6               | 36x5 $\frac{1}{2}$ | KH         | 146              | 60        |                                   |
| Lansden MG 6               | 8900              | 7              | Opt           | 35               | G-E              | G-E                | 4     | R          | Flot           | SP    | 36x7               | 36x6 $\frac{1}{2}$ | KH                 | 156        | 60               |           |                                   |
| Milburn Model 40           | 2000              | 1990           | 1985          | 15               | Opt              | 40                 | G-E   | Own        | 4              | W     | Math               | 32x4 $\frac{1}{2}$ | 33x5               | Gem        | 128              | 62        |                                   |
| Milburn Model 43           | 1000              | 1690           | 1585          | 18               | Opt              | 50                 | G-E   | Own        | 4              | W     | Math               | 32x4 $\frac{1}{2}$ | 32x4 $\frac{1}{2}$ | Gem        | 115              | 56        |                                   |
| Milburn Model 27D          | 500               | 1325           | 1085          | 20               | Opt              | 50                 | G-E   | Own        | 4              | W     | Math               | 33x4               | 33x4               | Gem        | 105              | 48        |                                   |
| Steinmetz 15               | 1500              | 2300           | 1950          | 16               | Opt              | 55                 | Diehl | Own        | 4              | R     | Russ               | 33x5               | 33x5               | Lav        | 114              | 60        |                                   |
| Walker 22                  | 2000              | 2500           | ...           | 14               | Opt              | 60                 | West  | West       | 5              | O     | Own                | 34x3 $\frac{1}{2}$ | 36x4               | Ross       | 101              | 66        |                                   |
| Walker 42                  | 4000              | 3700           | ...           | 13               | Opt              | 60                 | West  | West       | 5              | O     | Own                | 36x4               | 36x6               | Ross       | 114              | 66        |                                   |
| Walker M 2                 | 1250              | 2300           | ...           | 15               | Opt              | 60                 | West  | West       | 5              | O     | Own                | 34x3               | 36x3 $\frac{1}{2}$ | Ross       | 94               | 66        |                                   |
| Walker N                   | 10000             | 6300           | ...           | 10               | Opt              | 50                 | West  | West       | 5              | O     | Own                | 36x6               | 38x6 $\frac{1}{2}$ | Ross       | 141              | 66        |                                   |
| Walker P                   | 7000              | 5300           | ...           | 11               | Opt              | 50                 | West  | West       | 5              | O     | Own                | 36x5               | 38x5 $\frac{1}{2}$ | Ross       | 131              | 66        |                                   |
| Walter EN                  | 4000              | 4400           | 2575          | 15               | Opt              | 50                 | G-E   | G-E        | 5              | O     | Dead               | 36x4               | 36x7               | Gem        | 114              | 60        |                                   |
| Walter EL                  | 7000              | 4550           | 3475          | 13 $\frac{1}{2}$ | Opt              | 50                 | G-E   | G-E        | 5              | O     | Dead               | 36x5               | 36x4               | Gem        | 130              | 60        |                                   |
| Walter ES                  | 10000             | 7200           | 3975          | 12               | Opt              | 50                 | G-E   | G-E        | 5              | O     | Dead               | 36x6               | 40x6               | Ros        | 150              | 60        |                                   |
| Walter ER                  | 14000             | 7500           | ...           | 11               | Opt              | 50                 | G-E   | G-E        | 5              | Own   | Dead               | 36x7               | 40x7               | Ros        | 150              | 60        |                                   |
| Ward WS 2                  | 1650              | ...            | 13            | Opt              | 75               | G-E                | Own   | 4          | W              | Shel  | 32x3               | 32x3 $\frac{1}{2}$ | Own                | 88         | 56               |           |                                   |
| Ward WA                    | 2860              | ...            | 12            | Opt              | 52 $\frac{1}{2}$ | G-E                | Own   | 4          | W              | Shel  | 32x3 $\frac{1}{2}$ | 34x4               | Own                | 90         | 61               |           |                                   |
| Ward WA 2                  | 2470              | ...            | 12            | Opt              | 72 $\frac{1}{2}$ | G-E                | Own   | 4          | W              | Shel  | 32x3 $\frac{1}{2}$ | 34x4               | Own                | 90         | 61               |           |                                   |
| Ward WB                    | 3850              | ...            | 10.5          | Opt              | 45               | G-E                | Own   | 4          | W              | Shel  | 34x4               | 36x5               | Own                | 102        | 64               |           |                                   |
| Ward WB 2                  | 3350              | ...            | 10.5          | Opt              | 70               | G-E                | G-E   | 4          | W              | Shel  | 34x4               | 36x5               | Own                | 102        | 64               |           |                                   |
| Ward WD                    | 4875              | ...            | 9             | Opt              | 50               | G-E                | G-E   | 4          | W              | Shel  | 36x5               | 36x7               | Own                | 114        | 68               |           |                                   |
| Ward WD 2                  | 4350              | ...            | 9             | Opt              | 60               | G-E                | G-E   | 4          | W              | Shel  | 36x5               | 36x7               | Own                | 114        | 68               |           |                                   |
| Ward WF                    | 7200              | ...            | 8             | Opt              | 40               | G-E                | G-E   | 5          | W              | Shel  | 36x6               | 36x10              | Own                | 132        | 70               |           |                                   |
| Ward WF 2                  | 6450              | ...            | 8             | Opt              | 40               | G-E                | G-E   | 5          | W              | Shel  | 36x6               | 36x10              | Own                | 132        | 70               |           |                                   |
| Ward WH                    | 9400              | ...            | 7             | Opt              | 38               | G-E                | G-E   | 5          | W              | Shel  | 36x7               | 40x12              | Own                | 144        | 71               |           |                                   |
| Ward WH 2                  | 8200              | ...            | 7             | Opt              | 38               | G-E                | G-E   | 5          | W              | Shel  | 36x7               | 40x12              | Own                | 144        | 71               |           |                                   |

## Manufacturers and Models Included in Specifications on Preceding Pages

Acason— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Acason Motor Truck Co., Detroit, Mich.

Ace— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —American Motor Truck Co., Newark, Ohio.

★Acme—1,  $1\frac{1}{2}$ , 2, 3,  $4\frac{1}{2}$ ,  $6\frac{1}{2}$ —Acme Motor Truck Co., Cadillac, Mich.

Apx— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Hamilton Motor Co., Grand Haven, Mich.

Armleder—1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ —Armleder Motor Truck Co., Cincinnati, Ohio.

Atco— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —American Truck & Trailer Corp., Kankakee, Ill.

Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.

★Atlas—1,  $1\frac{1}{2}$ —Industrial Motor Corp., Rochester, N. Y.

★Atterbury— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Atterbury Motor Car Co., Buffalo, N. Y.

★Autocar— $1\frac{1}{2}$ , 2,  $3\frac{1}{2}$ , 5—Autocar Co., Ardmore, Pa.

Available— $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Available Truck Co., Chicago, Ill.

Avery—1—Avery Company, Peoria, Ill.

Bell—1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —Iowa Motor Truck Co., Ottumwa, Ia.

Belmont—1,  $1\frac{1}{2}$ , 2, 3—Belmont Motors Corp., Harrisburg, Pa.

★Bessemer—1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $4\frac{1}{2}$ —Bessemer Motor Truck Co., Grove City, Pa.

★Bethlehem—1, 2, 3—Bethlehem Motors Corp., Allentown, Pa.

Betz—7,  $2\frac{1}{2}$ —Betz Motor Truck Co., Hammond, Ind.

Bridgeport— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ —Bridgeport Motor Truck Co., Bridgeport, Conn.

Brinton— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —Brinton Motor Truck Co., Philadelphia, Pa.

Brockway— $\frac{3}{4}$ , 1 $\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Brockway Motor Truck Co., Cortland, N. Y.

Brown— $2\frac{1}{2}$ —Brown Truck Co., Duluth, Minn.

★Buffalo— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ , T.T.—Buffalo Truck and Tractor Corp., Clarence, N. Y.

C. T.—1,  $1\frac{1}{2}$ , 2,  $3\frac{1}{2}$ , 5—Commercial Truck Co., Philadelphia, Pa.

Casco—1—Casco Motors, Inc., Portland, Maine.

Case—2—J. L. Case Plow Works Co., Racine, Wis.

Chevrolet— $\frac{3}{4}$ , 1—Chevrolet Motor Co. of Mich., Flint, Mich.

Chicago— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Chicago Motor Truck, Inc., Chicago, Ill.

Climber— $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Climber Motor Corp., Little Rock, Ark.

★Clydesdale—1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Clydesdale Motor Truck Co., Clyde, Ohio.

Commerce— $\frac{3}{4}$ , 1 $\frac{1}{2}$ , 2,  $2\frac{1}{2}$ —Commerce Motor Truck Co., Detroit, Mich.

Concord— $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3—Abbott-Downing Truck & Body Co., Concord, N. H.

Corbitt— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3, 4, 5—Corbitt Motor Truck Co., Henderson, N. C.

Cyclone— $1\frac{1}{2}$ —The Cyclone Motor Corp., Greenville, S. C.

★Day-Elder—1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Day-Elder Motors Corp., Newark, N. J.

Dearborn—1,  $1\frac{1}{2}$ , 2—Dearborn Truck Co., Chicago, Ill.

Defiance—1,  $1\frac{1}{2}$ , 2—Defiance Motor Truck Co., Defiance, Ohio.

★Denby—1, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.

Dependable— $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ —Dependable Truck & Tractor Co., East St. Louis, Ill.

Diamond T— $1\frac{1}{2}$ ,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Diamond T Motor Car Co., Chicago, Ill.

Diehl—1,  $1\frac{1}{2}$ —Diehl Motor Truck Works, Philadelphia, Pa.

★International— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3, 5—International Harvester Co., Chicago, Ill.

Jackson— $\frac{3}{4}$ —Jackson Motors Corp., Jackson, Mich.

Kalamazoo— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Kalamazoo Motor Corp., Kalamazoo, Mich.

Kearns— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ —Kearns-Duglie Motors Co., Danville, Pa.

Kelland—Kelland Motor Car Co., Newark, N. J.

Kelly-Springfield— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Kelly-Springfield Motor Truck Co., Springfield, O.

Hug— $1\frac{1}{2}$ —The Hug Co., Highland, Ill.

Hurlburt— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5, 7—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.

Independent—1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —Independent Motor Truck Co., Inc., Davenport, Ia.

Indiana—1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Indiana Truck Corp., Marion, Ind.

Hawkeye—1—Hawkeye Truck Co., Sioux City, Iowa.

Hendrickson— $1\frac{1}{2}$ ,  $3\frac{1}{2}$ —Hendrickson Motor Truck Co., Chicago, Ill.

Hug— $1\frac{1}{2}$ —The Hug Co., Highland, Ill.

Hurlburt— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5, 7—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.

Independent—1,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ —Independent Motor Truck Co., Inc., Davenport, Ia.

Indiana—1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Indiana Truck Corp., Marion, Ind.

★International— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3, 5—International Harvester Co., Chicago, Ill.

Jackson— $\frac{3}{4}$ —Jackson Motors Corp., Jackson, Mich.

Kalamazoo— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Kalamazoo Motor Corp., Kalamazoo, Mich.

Kearns— $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ —Kearns-Duglie Motors Co., Danville, Pa.

Kelland—Kelland Motor Car Co., Newark, N. J.

Kelly-Springfield— $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ , 5—Kelly-Springfield Motor Truck Co., Springfield, O.

★Indicates Advertisers. See Advertisers' Index.

**Keystone**—2—Keystone Motor Truck Corp., Philadelphia, Pa.

★**Kissel**—1, 1½, 2½, 4—Kissel Motor Car Co., Hartford, Wis.

**Kleiber**—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.

**Koehler**—1½, 2½, 3½, 5, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.

**Lange**—2, 2½—Lange Motor Truck Co., Pittsburgh, Pa.

**Lansden**—3, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.

**Larrabee-Deyo**—1, 1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.

**Lombard**—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.

**Luedinghaus**—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.

**Maccar**—1½, 2, 3, 4, 5—Maccar Truck Co., Scranton, Pa.

★**MacDonald**—7—Union Construction Co., San Francisco, Cal.

**Mack**—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.

**Mason Road King**—1—Durant Motors, Inc., Long Island City, N. Y.

**Master**—1½, 2, 2½, 3½, 4, 5, T.T.—Master Trucks, Inc., Chicago, Ill.

**Maxwell**—1½—Maxwell Motor Co., Inc., Detroit, Mich.

**Menominee**—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Clintonville, Wis.

**Milburn**—Milburn Wagon Co., Toledo, O.

**Moline**—1½—Moline Plow Co., Moline, Ill.

**Moreland**—1, 1½, 2, 3, 5—Moreland Motor Truck Co., Burbank, Cal.

**Napoleon**—1, 1½—Napoleon Motors Co., Traverse City, Mich.

**Nash**—1, 2—Nash Motors Co., Kenosha, Wis.

**Nelson-LeMoon**—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.

**Netco**—2, 2½—New England Truck Co., Fitchburg, Mass.

**Niles**—2—South Main Motor Co., Pittsburgh, Pa.

**Noble**—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.

**O. K.**—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.

**Ogden**—¾, 1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.

**Old Reliable**—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.

**Oldsmobile**—1—Olds Motor Works, Lansing, Mich.

**Olympic**—2½—Olympic Motor Truck Co., Tacoma, Wash.

★**Oneida**—2, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.

**Oshkosh**—2, 2½—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.

**Overland**—1—Willys-Overland Co., Toledo, O.

**Packard**—2, 3½, 5—Packard Motor Car Co., Detroit, Mich.

**Paige**—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.

**Parker**—1, 2½, 3, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.

★**Patriot**—1, 2, 3—Patriot Mfg. Co., Lincoln, Neb.

**Penn**—2—Penn Motors Corp., 1714 N. Broad St., Philadelphia, Pa.

**Perfection**—¾, 1½, 2, 3—Perfection Truck Co., Minneapolis, Minn.

★**Pierce-Arrow**—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.

**Pioneer**—1—Pioneer Truck Co., Chicago, Ill.

**Pittsburgher**—1½, 2, 2½, 3, 3½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.

**Power**—1½, 3½—Power Truck & Tractor Co., St. Louis, Mo.

**Premocar**—1—Preston Motors Corp., Birmingham, Ala.

**Rainier**—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., New York, N. Y.

**Reliance**—1½, 2½—Appleton Motor Truck Co., Appleton, Wis.

**Reo**—1½—Reo Motor Car Co., Lansing, Mich.

**Republic**—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.

★**Rowe**—1½, 2, 2½, 3, 4, 5—Rowe-Stuart Corp., Lancaster, Pa.

★**Ruggles**—1, 2—Ruggles Motor Truck Co., Saginaw, Mich.

★Indicates Advertisers. See Advertisers' Index.

## Spreckels Prepares for Increased Production

The first of several large shipments of new machinery and additional tire manufacturing equipment has just been received by the Spreckels "Savage" Tire Co., of San Diego, Calif. The shipment includes a number of huge 15 ft. vulcanizing kettles, each weighing 17 ton., in addition to other tire-building machinery of the most advanced type.

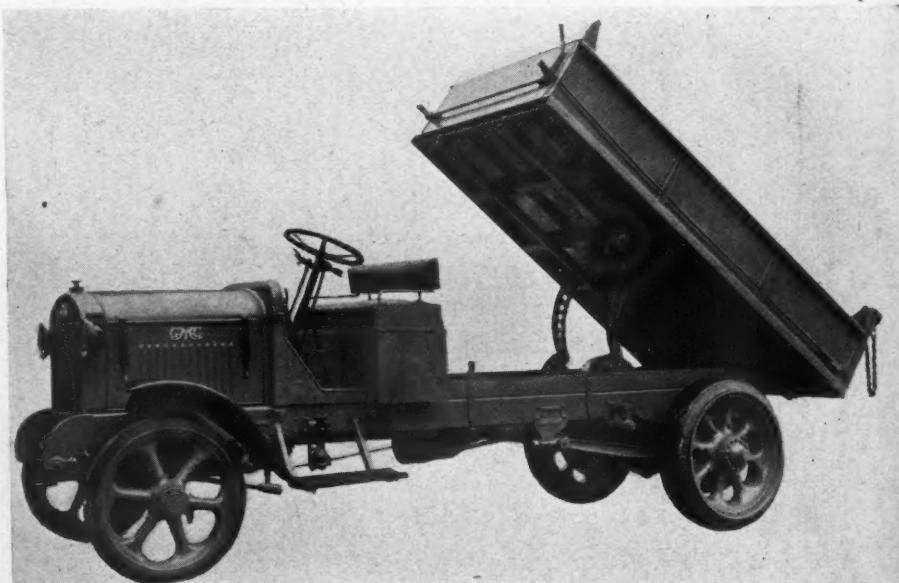
The Spreckels company finds it imperative to install additional equipment because of the continually increasing demand for Savage products.

## Wills Johnson Passes Away

Wills Johnson, chairman of the Appropriations Committee of General Motors Corporation, died suddenly Christmas Day at his home near Greenwood, Va.

Mr. Johnson also held a position as an assistant to Alfred P. Sloan, Jr., vice-president in charge of operations of General Motors.

Prior to coming with General Motors Corporation, Mr. Johnson had been connected with the duPont Company in the engineering department.



New Detroit Trailer Body Line Built Especially to Work With the New Borg and Beck Mechanical Hoist

These steel bodies are not only equipped with mud guards, but are especially designed to work in conjunction with Borg and Beck's recently introduced mechanical hoist, which is claimed to involve a new mechanical principle. The principle employed is the simple one of leverage applied in a new way. It utilizes the power of the truck engine in raising a heavily loaded body. It is claimed to raise the body to a maximum elevation, and not to interfere with the truck mechanism. The hoist is controlled from a lever on the steering arm of the truck. Drilling of the truck frame is unnecessary to attach hoist. Its low loading height also reduces the center of gravity of the entire unit. This new line of bodies is being offered by the Detroit Trailer Co., Detroit, Mich.

# Continental Announces New Line of Truck Engines

THE Continental Motors Corp., Detroit, is in production on an entirely new line of Red Seal engines, these being known as models J4, K4, L4 and B5, all four-cylinder units. Model J4 has a bore and stroke of  $3\frac{3}{4} \times 5$  in., and designed for one to  $1\frac{1}{2}$ -ton capacity trucks. Model K4 has a bore and stroke of  $4\frac{1}{8} \times 5\frac{1}{4}$ , for 2 and  $2\frac{1}{2}$ -ton capacity trucks. Model L4, a bore and stroke of  $4\frac{1}{2} \times 5\frac{1}{2}$ , for 3 and  $3\frac{1}{2}$ -ton capacity trucks. Model B5, a bore and stroke of  $4\frac{3}{4} \times 6$ , for 5-ton and above capacity trucks.

The new line represents the culmination of many years' experience in engine construction, for the design provides an exceptional degree of standardization and interchangeability, which permits of volume production, economic manufacturing and low costs. In other words, the new engines have a greater value per dollar not only to the truck manufacturer but to the owner and service station.

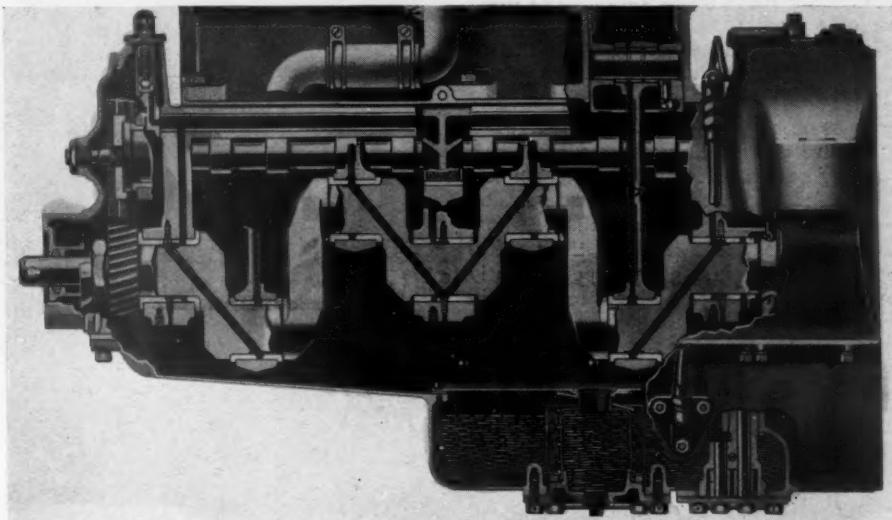
The striking feature of the new line is that of the approximately 274 component parts which go to make up each engine, 211, or 77 per cent, are common to all four models. This interchangeability is

not limited to merely bolts, nuts, screws, etc., but applies to each major item and where practical to carry out the plan.

This interchangeability and standardization means that the dealer's investment in parts is reduced to a minimum and that

dealers considering the flat-rate method of servicing will find the new design simplifies the preparation of cost operations, etc.

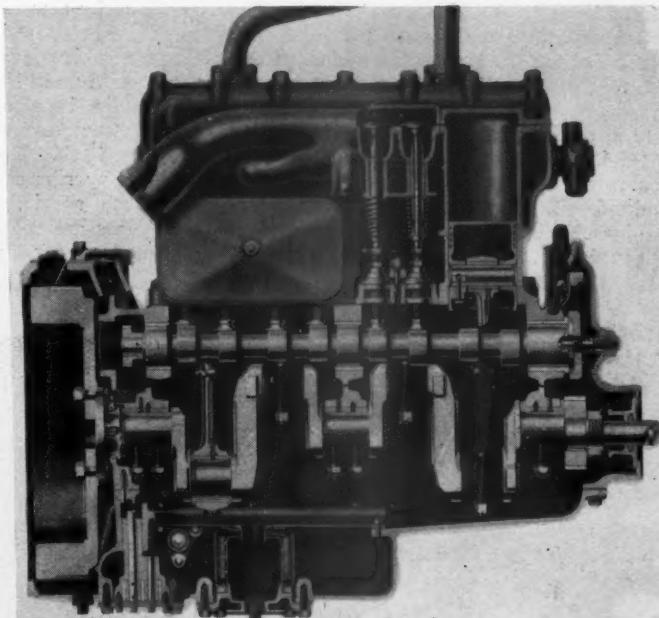
The design is along standard approved practice and conforms to S. A. E. stand-



Longitudinal Sectional View Showing Full Pressure Feed Through Drilled Crankshaft and Having Direct Pressure to Piston Pin Bearings.

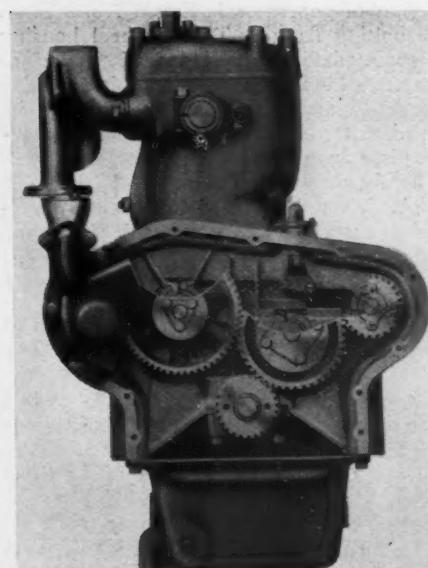
Right: Sectional View of Continental Red Seal Model J4 Engine, in Which Interchangeability of Parts and Standardization Are Features.

Below: Cross Section View Showing Idler Gear and Oil Relief Valve Assembly.

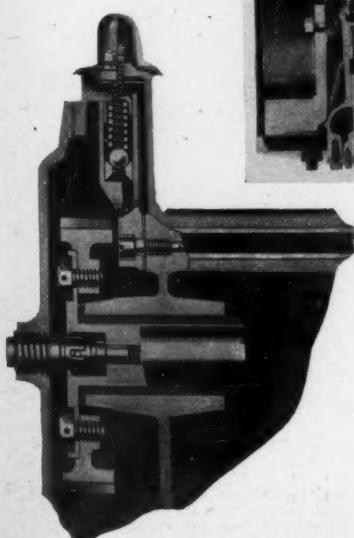


economy, or lower maintenance costs are assured to the user. Viewed from the service angle it means that the average truck dealer will be able to supply parts promptly and that the owner will suffer less loss by the factor of idle time, and when replacements are necessary. Another service angle is that inasmuch as all four engines are practically identical the mechanic is enabled to service the line much more easily, turn out better work and at a less cost for labor. It also means that one set of service tools will apply instead of a large variety. Those truck

ards throughout. Consideration has been given to the factor of accessibility to exterior and interior components, which spells lower maintenance costs because of the time conserved. This strict conformance to S. A. E. standards permits the truck manufacturer to utilize that equipment which best meets his requirements,



Cross Sectional View Showing Gear Case and Gear Train, Which is in Balance, and With Tooth Pressure Equalized



Inasmuch as all engines are practically identical, with the exception of those factors having to do with the difference in size and capacity, the description of the model K4 will apply to the entire line. The L4 and B5, however, are distinguished from the two smaller models by the cylinders being cast in pairs, whereas the J4 and K4 are cast in block. All are of the vertical, L-head type with removable heads.

The K4 has a piston displacement of 281 cu. in., and develops 36.5 hp. at 1500 r.p.m., the recommended governed speed. The weight is 680 lbs., without equipment. The well-known Continental practice of a crankcase embodying the principles of the bridge truss is continued as is cooling by a centrifugal water pump.

All metal timing gears are used and these so arranged that the gear train is in balance and tooth pressures equalized. Quiet operation and efficiency are emphasized. In the gear case cover provision is made for adjusting the end thrust transmitted to the gears through their spiral cut teeth. The idle gear is permanently attached to its shaft which revolves in two bushings held in the crankcase. Gears are accessible by removing the gear case cover.

Lubrication is by a full pressure feed system through drilled crankshaft, with the gear pump being driven from a spiral gear on the camshaft and readily removed from the aluminum oil pan, which is bolted to the bottom of the crankcase. The variation in oil pressures, due to engine speed, viscosity, etc., is automatically controlled by a pressure valve which is adjusted to meet the requirements of varying operating conditions. The oil supply is eight quarts and economy is emphasized of the lubrication system.

The engine requires a vertical outlet type of carburetor with a 1 1/4-in. S. A. E. flange. Any standard type of governor may be employed. In the matter of ignition, provision is made for both magneto and an engine-driven type of battery ignition. The crankcase takes any standard design of generator having a No. 2 S. A. E. bolting flange. The flywheel housing accommodates any standard make of starter which has a standard pinion. The S. A. E. sleeve type mounting is 3 1/2-in. in diameter. Either a multiple disk or 12-in. plate type of clutch can be employed. The flywheel housing flange is a No. 2 S. A. E. standard. The Continental three-point suspension is employed.

### Olds Builds Addition for Axle Manufacture

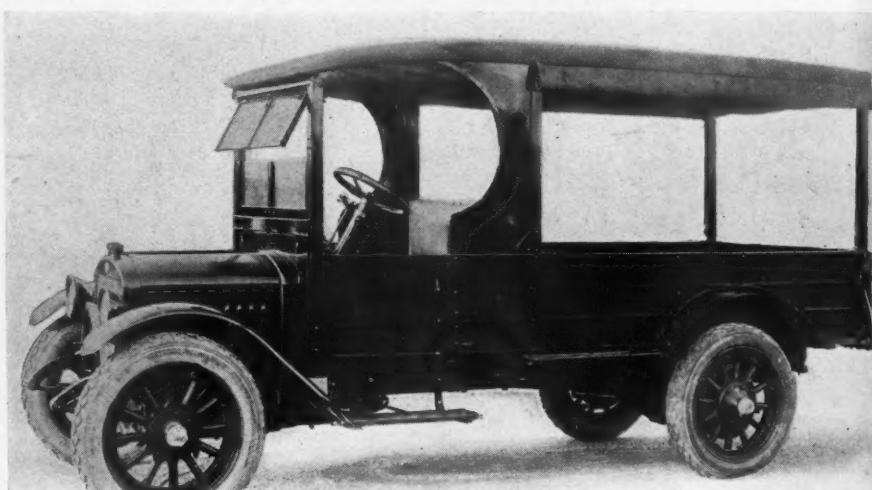
A new factory 140 by 750 ft., with a floor area of 105,000 sq. ft., has been given over to the manufacture of axles alone, by the Olds Motor Works, of Lansing, Mich. The equipment of this plant at present consists of machinery to manufacture 400 front and 400 rear axles per day. Sufficient room for expansion has been allowed so that a total of 1600 front and rear members daily can be made at any time when production warrants.

## Babcock Brings Out a New Express Body

THE H. H. Babcock Co., Waterbury, N. Y., recently added a unit to its extensive line. It is an express body and is known as Style No. 45. The following dimensions will give a fair idea as to the spaciousness of the loading section: Length, 98 in.; width, 56 1/2 in.; height, center of body, 64 in.;

The quarter panels beside the driver are of 18-gage metal, the edges being reinforced with angle steel. The lower half of the built-in ventilator is stationary and the upper half ventilating.

Storm curtains are provided for the driver with Pyralin lights and a pocket in the driver's side to permit signaling.

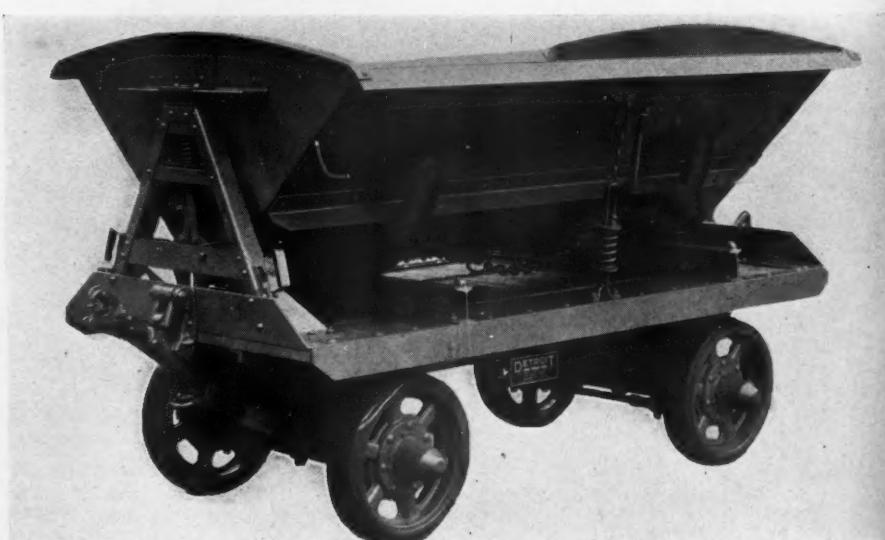


New Babcock Express Body, Style No. 45

height, of side panel, inside, 19 1/2 in., and width between wheel houses, 45 in.

The inside panels and side sills are made in one integral unit. The panels are reinforced and tied by a 14-gage steel plate on the inside, which runs the full length of the body. It is 19 in. high with a 1 1/4 in. flange on the bottom. Although securely tied by steel plates the side panel and side sill formation is further reinforced by the employment of three straps, which brace the structure at two points.

The side curtains are one piece and are stiffened by a wood run the full length of the curtain spaced about 6 in. from the bottom, which facilitates the rolling up of the curtain and keeps the curtain in shape. A curtain is also provided behind the driver's seat, extending from the roof to the lazy back. The roof is closed slated with heavy ribs and covered with No. 12 sail cloth specially treated and painted. Foredoors are regular equipment and are designed to correspond with side panels.



An Industrial Trailer for Use in Foundries, Machine Shops, or Where Bulky Material is Handled

It is offered by the Detroit Trailer Co., Detroit, Mich., has a rated capacity of 2 tons, can be pulled in trains, and steered from either end. The body can be removed readily and packages and other articles placed on the platform. The capacity of the body is 1 1/2 cu. yd. water level

# News of the Trade in Brief

## New Ignition Manufacturer in Poughkeepsie

Announcement has been made of the incorporation in Delaware of the DeJon Electric Corp., manufacturers of Ignition Technique. This is a \$500,000 corporation for the purpose of manufacturing a very high-grade electrical system for motor cars.

Much interest has been aroused by this announcement because it is understood that it is the culmination of careful planning extending over a period of time.

The factory at Poughkeepsie, N. Y., where the new system will be manufactured, has been equipped with modern and elaborate machinery.

### SHOWS

**January 20 to 27, 1923—Montreal, Canada.** National Motor Show of Eastern Canada, auspices of Montreal Automobile Trade Assn., Almy Department Store.

**January 20 to 27, 1922—Detroit, Mich.** 22nd annual show of Detroit Auto Dealers' Assn., Municipal Garage Bldg. (100,000 sq. ft.). Passenger cars, trucks and accessories. H. H. Shuart, Mgr., Hotel Addison.

**January 20 to 27, 1923—Milwaukee, Wis.** 15th annual show, Milwaukee Automotive Dealers' Assn. Auditorium. Passenger cars, trucks, tractors and accessories. Bart J. Ruddle, 316 Brundt Bldg.

**January 27 to February 3, 1923—Chicago, Ill.** Annual Automobile Show of the N. A. C. C. in the Coliseum and 1st Regt. Armory. S. A. Miles, Mgr., care of N. A. C. C., 46th St. and Madison Ave., New York City.

**January 29 to February 3, 1923—Ann Arbor, Mich.** Annual show, auspices of Washtenaw County Auto Dealers' Assn. (M. A. T. A. Circuit), Joseph Thompson, Secy.

**February 3 to 10, 1923—Pittsburgh, Pa.** 26th annual show, auspices of Pittsburgh Automobile Dealers' Assn., Motor Sq. Garden. W. A. Richwine, Secy., 5941 Baum Blvd.

**February 3 to 10, 1923—Troy, N. Y.** 9th annual show, direction of Troy Used Car Sales Corp., New State Armory (60,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Frank M. Baucus, Mgr., 155 River St.

**February 3 to 10, 1923—Minneapolis, Minn.** 16th annual automobile show, auspices Minneapolis Automobile Trade Assn. Passenger cars, trucks, tractors, accessories. W. R. Wilmot, Mgr., 709 Andrus Bldg.

**February 5 to 10, 1923—Winnipeg, Canada.** Annual automobile show, auspices of Winnipeg Motor Traders' Assn., at Minto Barracks. Automobiles and accessories. A. C. Emmett, Secy., 202 Scott Block, Winnipeg.

**February 5 to 10, 1923—Charlotte, N. C.** Third annual show of the Charlotte Automotive Trade Assn., Carolinas Exposition Bldg. Passenger cars, trucks and accessories.

**February 5 to 10, 1923—Winnipeg, Canada.** Third annual Equipment show of the Western Canada Automotive Equipment Assn. Automotive equipment and accessories, radio exhibits. W. L. Williams, Secy., Box 3164.

**February 5 to 11, 1923—Toledo, O.** Annual show of Toledo Auto Shows Company, Terminal Auditorium. H. V. Buelow, Mgr.

**February 10 to 17, 1923—Kansas City, Mo.** 16th annual show of Kansas City Motor Car Dealers' Assn., at Overland Bldg. (150,000 sq. ft.) Passenger cars, trucks and accessories. Geo. A. Bond, Secy.

**February 12 to 17, 1923—St. Louis, Mo.** 16th annual show, auspices of St. Louis Automobile Dealers' Assn. Passenger cars, trucks and accessories. Robert E. Lee, Mgr., 2124 Locust St.

**February 12 to 19, 1923—Portland, Ore.** 14th annual show of Automobile Dealers' Association of Portland, Inc. Municipal Auditorium (36,000 sq. ft.) Passenger cars, trucks, tractors and accessories. Ralph J. Staehli, 424 Henry Bldg.

## Mrs. Morse Resigns as Parish & Bingham Head

Mrs. Agnes D. Morse, for many years head of the Parish & Bingham Co., Cleveland, has resigned as president of that company and will be succeeded in the active management by E. J. Kulas, of Crouse-Tremaine-Kulas Co. Mrs. Morse, one of the few women who have ever operated a large manufacturing concern has the distinction of heading a plant whose business has grown from around \$200,000 a year to \$9,000,000 a year.

The present board of directors consists of S. J. Wainwright, H. C. Sherrard, A. D. Morse, G. A. Coulton, C. S. Eaton, E. J. Kulas, and F. H. Ginn.

## New Inner Tube Plant in Trenton

The Semple Manufacturing Co., Trenton, N. J., which was incorporated November 3, 1922, under New Jersey laws with an authorized capital of \$100,000, is now located in the plant formerly operated as a reclaiming plant by W. B. John, under the name of the Sanhican Rubber Co. Tube-making machinery and equipment and all copyrights have been purchased from the receiver of the Semple Rubber Co., by the new concern and production is to begin at once on red and gray inner tubes. Officers are Charles H. Semple, president; William B. John, treasurer; J. Walter Miller, secretary.

### Coming Events

**February 12 to 17, 1923—Norfolk, Va.** 5th annual show of Norfolk Automobile Dealers' Assn. at the Billy Sunday Tabernacle, R. C. Taylor, director.

**February 16 to 26, 1923—San Bernardino, Calif.** Automobile exhibit in connection with 13th annual National Orange Show. Tent. Passenger cars, trucks, tractors and accessories. R. H. Mack, Mgr., 215 Chamber of Commerce Bldg.

**February 17 to 22, 1923—New York, N. Y.** Universal Exposition of Invention and Patents, auspices of Universal Patent Exposition Corp., at Grand Central Palace. Exec. Offices, World's Tower Bldg., 110 W. 40th St., New York.

**February 17 to 24, 1923—San Francisco, Calif.** 7th annual Pacific Coast Show, sanctioned by Motor Car Dealers' Assn. of San Francisco, Exposition Auditorium. Passenger cars, trucks, tractors and accessories. G. A. Wahlgren, Mgr., 215 Humboldt Bank Bldg.

**February 17 to 24, 1923—Akron, Ohio.** 9th annual show of the Akron Automobile Exhibition Co., Central Garage (45,000 sq. ft.). Passenger cars, trucks, tractors, accessories. E. T. Jones, Mgr., 1091 W. Exchange.

**February 19 to 24, 1923—White Plains, N. Y.** Third annual show of White Plains Auto Dealers' Assn., auspices of 102nd Ammunition Train N. Y. N. G. State Armory. Passenger cars, trucks, tractors and accessories, Callahan & Partlan, P. O. Box 1186, Pittsfield, Mass.

**February 20 to 24, 1923—Deadwood, S. D.** 11th annual show of Deadwood Business Club. Auditorium. Passenger cars, trucks, tractors, accessories and radio. F. R. Baldwin, Mgr.

**February 21 to 24, 1923—Trenton, N. J.** 8th annual show, Trenton Automobile Dealers' Assn. at 2nd Regt. Armory. Passenger cars, trucks and accessories. Frederick Petry, Jr., W. State and Willow Sts.

**February 24 to March 3, 1923—Brooklyn, N. Y.** Annual automobile show of the Brooklyn Motor Vehicle Dealers' Assn., Inc., at 23rd Regt. Armory. Ralph Ebbert, Exec., Secy.

**February 26 to March 3, 1923—Omaha, Neb.** 18th annual show, Omaha Automobile Trade Assn., Inc. Municipal Auditorium. Passenger cars, trucks and accessories. A. B. Waugh, Mgr., 2051 Farnam St.

**February 26 to March 3, 1923—Springfield, Mass.** Annual automobile show, auspices of the Springfield Automotive Dealers' Assn.

**February 26 to March 3, 1923—Syracuse, N. Y.** 15th annual show at State Armory (43,000 sq. ft.) Passenger cars, trucks and accessories. Howard H. Smith, Mgr., 701 Eckel Bldg.

**March, 1923—Portland, Maine.** 10th annual show of Portland Auto Dealers' Assn., Exposition Bldg. (46,000 sq. ft.) Passenger cars, trucks, tractors and accessories. Howard B. Chandler, Mgr., 3 Park Ave.

**March 10 to 17, 1923—Boston, Mass.** 21st annual show, auspices of Boston Automobile Dealers' Assn. & Boston Commercial Motor Vehicle Assn., Mechanics' Bldg. (125,000 sq. ft.) Passenger cars, trucks, tractors and accessories, Chester I. Campbell, Mgr., 5 Park Sq.

**March 28 to 31, 1923—Greenville, S. C.** Annual Automobile Show at Textile Hall, auspices of Automotive Bureau of Chamber of Commerce.

### CONVENTIONS

**Chicago, Ill., January 15 to 19, 1923**—13th American Good Roads Congress and 14th National Good Roads Show, American Road Builders' Assn., at Congress Hotel and the Coliseum.

**Chicago, Ill., January 29 to 31, 1923**—Annual meeting of the Automotive Electric Assn., Congress Hotel.

**Chicago, Ill., January 29, 1923 (tentative)**—Advertising managers' convention of the N. A. C. C.

**Chicago, Ill., January 20 to 30, 1923**—6th annual convention of the National Automobile Dealers' Assn., Hotel La Salle.

**Chicago, Ill., January 31, 1923**—Meeting and Dinner of Society of Automotive Engineers, at the Congress Hotel.

**Cleveland, O., February 19 to 20, 1923**—Annual Convention of the National Highway Traffic Association. Elmer Thompson, Secy.

**Corpus Christi, Texas, March, 1923**—Convention of Texas Automotive Dealers' Assn. W. A. Williamson, Mgr., San Antonio, Tex.

**New York, N. Y., January 17, 1923**—Annual meeting of the Greater New York Tire Dealers' Assn., 242 W. 56th St., R. H. Johnston, Act. Secy.

**Oakland, Calif., February 26 to 27, 1923**—Northern Division meeting of the California Automobile Trade Association, Robert W. Martland, Secy.-Mgr.

**Quincy, Ill., March 3, 1923**—Fourth annual convention of the Illinois Automotive Trade Assn. F. C. Zillman, Mgr., 212 Lehmann Bldg., Peoria, Ill.

**Richmond, Va., March 8, 1923**—Annual convention of Virginia Automobile Dealers' Assn., Murphy Hotel.

**Salt Lake City, Utah, February, 1923**—Annual meeting of Intermountain Automotive Trades Association. C. L. Snow, Mgr., Salt Lake City.

**Sioux Falls, S. D., January 15, 1923**—First meeting of the Automotive Trade Association of South Dakota.

**Topeka, Kansas, January 15, 1923**—Convention of Automobile Trade Association of Kansas. Phil. E. Zimmerman, Topeka.

### FOREIGN EVENTS

**Brussels, Belgium, January 13 to 24, 1923**—16th annual Automobile and Cycle Exposition, Palais du Cinquantenaire. Passenger cars, trucks, tractors, accessories, etc.

**London and Birmingham, England, February 19 to March 2, 1923**—British Industries Fair. Apply British Consulate General, Chicago, Ill.

**Rome, Italy, March 19 to 24, 1923**—General meeting. International Chamber of Commerce.

**Seville, Spain, May, 1923**—International Road Congress.

## White Reviews Past Year in Truck Industry

### Motor Truck Transportation Created a Place for Itself in History During 1922

According to publicity released by the National Automobile Chamber of Commerce, through Winsor T. White, chairman of the Motor Truck Committee, the past year will go down in motor truck transportation history as an epochal one in many respects.

Over 1,400,000 tons of freight, including 134,400,000 tons of farm products, were hauled over the highways by over 1,250,000 trucks.

The significance of this movement can be better understood when one realizes that it means assistance to rail as well as motor truck shipments.

The reason for this widespread success in the development of supplemental facilities to the railroads by the trucks is that the shippers are beginning to appreciate generally the fact that in proportion as they relieve the railroads of less-than-carload shipments will the railroads be able to render them more efficient and cheaper service on their long-haul consignments.

Today approximately seventy-five per cent of the work in the Texas and Oklahoma oil fields is carried on by means of specially designed truck and trailer combinations. It is estimated that \$948,000,000 will have to be spent on new productive oil acreage and new well operations, which will obviously entail large-scale motor truck operations within current year.

Approximately seventy-five per cent of the copper, lead and zinc mining operators are under the necessity at the present time of transporting both their products and supplies to and from their local supply stores in trucks, inasmuch as the tonnage shipped from any one mine is not great enough any one season of the year to make it profitable for the railroad to establish direct connection in most cases. In the mining of coal, also, there has been a pronounced tendency of late to motorize all the processes of extraction and conveyance, evidenced by the fact that products from approximately 3300 mines are being hauled now in commercial vehicles.

There is every reason to believe that the other products that find their way to market and railroad siding from agricultural areas will be carried in trucks on a larger scale during the current year. The farmer today is in a much stronger position to purchase farm equipment than in recent months, the value of last year's crops being \$6,600,000,000, an increase of \$1,250,000,000 over the preceding year.

The Post Office Department at Washington after seven years experience with motor trucks has come to the conclusion that they have many advantages over horse-drawn equipment, even where the distance to be traveled is short.

The American Railway Express, probably the largest user of local transportation units in this country, has also found that increased economy, larger volume of business and greater satisfaction result from truck usage.

Coincident with this important change toward extensive motorized service in local and suburban freight service, there has come about an equally striking realignment in urban passenger transportation. The necessity for some such change as this will be appreciated, when it is recalled that there has been an increase in urban population of 12,192,826, or 28.6 per cent in the last ten years and that our rural population has increased only 1,518,016, or 3.1 per cent.

Over fifty-six street railway companies are today operating 350 buses as adjuncts to rail lines.

### Receiver Appointed for the Hercules Motor

A receiver has been appointed in the United States District Court at Cleveland, on the application of a creditor, for the Hercules Motor Manufacturing Company, of Canton, Ohio.

The appointee is Charles Balough, vice-president and general manager of the company, who under court orders, will continue the operation of the business without interruption.

December 1, 1921, a creditor's committee was appointed for the company through the co-operation of which a year's extension was obtained from the general creditors for the company, which extension expired December 1, 1922. More recently a further extension was requested until February 1, 1923, which extension was granted by the majority of the creditors, but due to the lack of co-operation of a few, more especially some concerns forcing large damage claims, the present situation has been brought about.

It is expected that a further meeting of the creditors' committee and later likely a further general creditors' meeting will be arranged for discussion of further plans regarding the company's affairs.

Leading stockholders have sent out the following letter to the trade:

"Dear Sirs: We desire to inform you that the Hercules Motor Mfg. Co., Canton, Ohio, has gone into the hands of a receiver, Mr. Chas. Balough, former general manager, having been appointed receiver by the Federal Court, Cleveland, Ohio, January 5, 1923.

"This step was taken at the instance of creditors, to conserve the assets of the company, in the best possible manner, for the benefit of creditors and stockholders. The receiver was authorized by the court to continue the operation of the business. This action insures that the business will be carried on without interruption and the integrity of the property, as a going concern, preserved; consequently all customers and prospective customers of the Hercules Company may rest assured that the high character of the company's product will be maintained, and that all orders will be promptly executed.

"We, with other stockholders and associates of strong financial ability, realizing that the company has an unusual and desirable product, hope to accomplish a reorganization of the business which will provide ample financial resources to place the company in the strongest possible position to produce motors and parts for the trade."

(Signed by leading stockholders.)

"Handy Instruments for Everyday Use," a folder giving information for instrument users about its line of portable ammeters and voltmeters, has recently been issued by the Westinghouse Electric & Manufacturing Co.

### Flat-Rate Service Adopted by United Motors Service

#### Flat-Rate System in Truck Service Continues to Make Progress

The United Motors Service, with general offices in Detroit, has put into effect the flat rate repair service in its 21 branches in the principal cities of the United States and Canada for maintenance repair operation on the electrical equipment it services—Delco and Remy starting, lighting and ignition systems and Klaxon horns.

The maintenance repair at the rates established is available at these branches to any car owner or the trade.

This is undoubtedly the first flat-rate service put into effect by any large company, with wide distribution, giving service on motor car electrical equipment.

The schedules of this company are designed to give the customer:

1. A flat rate on his job, which includes both repair charge and material.
2. A uniform price on the same job at any branch.
3. A price based exactly on the condition of his job and the work to be done—not a "general average" of similar jobs done in the past.

J. W. Parry, technical manager, explains that there are two distinct features of the flat-rate service of this company which are unique.

"In the first place," he states, "the rate of our service is the same in every section of the country. The usual flat-rate system varies in different sections of the country due to the different cost of labor. Our flat rate is the same in every branch whether in the United States or Canada."

"In the second place practically all our major complete operations are sub-divided, with charges made separately for each sub-section, with the result that a car owner pays only for just the service he receives."

Before a price on any job is given, an examination of the electrical equipment of the motor vehicle is made, and only after this diagnosis, is the price given. If this examination cannot be made in a short time, the price is later conveyed to the person desiring the repair.

The repair charge given on a complete unit in the schedule always includes minor operations needed.

### Wayne Company in New Building

The Wayne Tank & Pump Co., of Fort Wayne, Ind., celebrated its thirtieth birthday recently by moving the executive offices into a handsome new office building.

The new administration building is separated from the main plant buildings and is modern in every respect. It is of fire-proof construction, of handsome tapestry brick, and is one of the most distinctive industrial buildings in Indiana. The cost of the plant improvement, exclusive of the administration building, amounts to \$250,000.

# See Ruggles Trucks During Chicago Show

The regular annual exhibit of Ruggles Trucks will be held in the Hotel Sherman lobby, Chicago, January 27 to February 3.

While you are attending the big automotive show, take time to see this truck exhibit.

Examine the chassis. See, point by point, why the Ruggles is the most efficient and most economical business truck. See the selection of bodies—a Ruggles Truck for every business.

You will understand why we were able to build a nation-wide dealer organization in a comparatively short time. You will know why Ruggles dealers established an unusual sales record during the past year.

All signs point to *big truck business in 1923*. You naturally want some of this prosperity. The first step is to represent the right truck and be connected with a go-getter organization.

We know we have the truck and we believe we have the organization. You can prove both points if you'll visit us at the Hotel Sherman.

*Dealers not attending the Chicago Show,  
write for the 1923 Ruggles Selling Data*

**RUGGLES MOTOR TRUCK COMPANY**  
Saginaw, Michigan

*Canadian Factory:*  
Ruggles Motor Truck Co., Ltd., London, Ontario

# RUGGLES

*The World's Greatest Truck Value*



**On Display  
Hotel Sherman  
January 27  
to  
February 3**

## New United States Plan of Selling Motor Trucks

**It Involves the Concentration of Sales Efforts on Territory Within a Radius of 300 Miles of the Company's Plant**

The United States Motor Truck Co., of Cincinnati, O., has announced a new sales policy that will be known as "The United States Plan" of selling motor trucks. Briefly, the plan contemplates a concentration of sales efforts on territory within a radius of 300 miles of the company's plant, this territory including the states of Ohio, Indiana, Kentucky and West Virginia, with some territory just outside these states yet within the specified radius. Several large metropolitan centers are included in this territory. After this territory is thoroughly covered the effort will be gradually extended in a wider radius.

The plan also includes factory co-operation with the dealer beyond anything heretofore attempted by most factories, for the dealers will be close enough to the home plant that such co-operation will be made possible at all times. The entire efforts of the factory will be concentrated in the future on building up a comprehensive, thorough dealer organization, covering every possible source of sales within the restricted zone of operation.

With a sales machine of this type in operation, a drive will be made on potential motor truck owners throughout the states covered by the company.

The United States Company has long felt that the modern efficient motor truck dealer is far more interested in selling motor trucks that are reasonably priced, therefore, more attractive to the customer with a dealer discount that enables him to make money, rather than tempting him to give most of his profit away in trade allowances that are absolutely unwarranted. The recent reduction in prices of the entire United States line, together with a rearrangement of the discounts, puts the dealer in position to go out after business on its merits, not as a horse trading proposition where he has to match his wits against the customers in dickering for old and worn out trucks in trade.

The company plans to work very closely in touch with its dealers, and to this end has divided the territory covered into small enough units that a direct factory representative may cover each unit thoroughly, working with the dealers in every department of their business, and constantly building up sales efficiency that should result in real profits to the dealer who co-operates.

These representatives will always be near enough that they may be called upon to help put over especially difficult sales or large contracts.

In addition to the help of the district men, the factory will carry on a mail campaign with truck users and prospects who will twice a month receive from the factory letters and literature in a regular

series, so arranged that its cumulative effect will be very strong indeed.

The factory also ties up the local dealer and his prospects through newspaper advertising in the local papers, painted bulletin boards in his territory and poster bill boards.

The United States executives believe that one of the biggest factors that will work for the success of this plan is the published, established price at which their trucks will be sold. The company believes there has been too much of an air of mystery around truck prices in the past, that has led to too much bargaining and dickering every time a sale is made.

The United States Motor Truck Company can now build trucks cheaper than in the past, and believes it best to pass the saving on to the customer rather than keep it in the form of greater factory profits.

A system of vocational classification, with complete data on each classification, is being assembled by the company for the use of its dealers, and the dealers and their salesmen will be schooled in making the most efficient use of this sales material.

The potential possibilities for the sale of trucks in each dealer's territory will be analyzed for him, so that he will have a mark to shoot at and know whether he is getting all the business he should or not.

The whole plan is arranged to bring the factory, the dealer and the customer closer together, and already very pleasing progress has been made under the new arrangement.

The United States Motor Truck Company is one of the oldest in the business, having been building the line for over fourteen years. A recent financial statement of the company shows it to be one of the strongest, financially, in the business. Their line is complete and includes 7 models ranging in size from 1 1/4 to 7 tons capacity, with bodies built in the U. S. factory, suitable for all kinds of motor transportation.

The development of its new intensive sales plan will be watched with much interest by the motor truck industry.

### Truck Course at Michigan Agricultural College

One of the agricultural colleges that fully appreciates the importance of motor transportation on the farm is the Michigan Agricultural College, East Lansing, Mich. Three courses are given under the department of farm mechanics in the mechanics of tractors and trucks, each of four weeks' duration.

A week is devoted to each of the major divisions of the work in gas engines, engines, carburetors, tractors, trucks and ignition. These courses are designed primarily to train the farm boy to become a good tractor and truck operator and not intended to make expert automotive mechanics.

Last year a total of 100 men took the course. The college does not anticipate as great a number this winter.

## Increase in Motor Truck Tires Anticipated for 1923

**Limitations Placed on Rubber Growers in British Possessions to Work a Hardship on American Truck Users**

Motor truck tires are going to cost more money in 1923, is the sad news given out by the big tire companies, and most of them are feeling worse about it these days than are the truck owners themselves.

Crude rubber, the big item in truck tires, sold for 14 cents a pound in September, 1922. By December it had risen to 27 cents, and predictions are freely made that the latter part of 1923 will see rubber selling at over 50 cents a pound. The war-time peak price of rubber was 62 cents a pound.

Here's what is making rubber go up:

Much of the crude rubber used in the automotive industry is raised in British possessions, in fact, about 85 per cent of it. British plantation owners have been successful in having the government pass laws practically limiting the production of rubber on these plantations to such an extent that the price can not fail to rise higher and higher, so that the owners, while they are raising less rubber, are getting so much more for it that they will, in the language of their Yankee brothers, make a "clean up."

The basis of this limitation was the annual consumption of crude rubber from November 1, 1919, to October 31, 1920, or 335,000 tons. The British growers are now allowed to sell ONLY 60 PER CENT OF THIS FIGURE PER YEAR free of excise tax, and when they sell more than this they have to pay a very heavy tax on what they sell. There is also a slight additional tax put on them if the price received is over 32 cents a pound, but not enough to hurt their feelings any.

It will be noticed that the basis for figuring the limitation was taken on production over two years ago. Since that time the annual consumption has become much greater, of course, yet no change has been made in this limitation.

The present stock of rubber in this country will be wiped out by late 1923, according to rubber authorities, and where prices may go after that is a subject for wild guessing. One English rubber journal has predicted it may go to \$2 per pound, if a change is not made in the present British law.

Authorities in Akron tire plants say that the rise in rubber is going to cost each of the big Akron tire companies over \$20,000 a day, during 1923, and, of course, this extra cost must be passed on to motor truck and passenger car owners.

It is claimed that even as a result of the price rise to date, it will cost the public over \$100,000,000 more for tires in 1923 than as if the price had remained stationary.



## Strength for Long Service Light Weight for Economy

TO carry a truck through years of hard, everyday service, a wheel must possess abundant strength. But to help the truck to operate satisfactorily and economically, the wheel should possess other qualities, too.

Bethlehem Wheels are made of *rolled* steel, from a special Bethlehem rolled I-beam. They are strong—so strong that they are guaranteed unqualifiedly to outlive any truck on which they are placed.

But—combined with rugged strength, Bethlehem Wheels possess the light weight that means reduced wear and tear, fewer repair bills, greater economy. And Bethlehem Wheels are resilient. They assist the springs in absorbing road shocks.

Strength and light weight and resiliency! Its *rolled* steel construction endows the Bethlehem Wheel with all three of these essentials of satisfactory, economical service.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*Sales Offices in the Following Cities:*

New York  
Baltimore

Boston  
Atlanta

Philadelphia  
Cleveland

Washington  
Buffalo

Pittsburgh  
Chicago

Detroit

St. Louis  
San Francisco

# BETHLEHEM ROLLED STEEL TRUCK WHEELS

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON  
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

## Traffic Regulations to be Discussed at Good Roads Congress

Over 85,000 Invitations Extended to Congress and Exhibit at Chicago

A movement likely to result in the enactment of uniform highway traffic regulations throughout the country is expected to develop at the Thirteenth American Good Roads Congress and Fourteenth Good Roads Exposition to be held January 15 to 19 in Chicago, under the auspices of the American Road Builders' Association. This subject is agitating the entire field of highway transportation and development at present and the indications are that it will be brought to a head through a proposal by President T. J. Wasser, of the road-builders' organization in his annual address January 16. Mr. Wasser will propose joint action by the American Road Builders' Association, the American Society of Automotive Engineers, the American Automobile Association, the National Automobile Chamber of Commerce, the American Association of State Highway Officials and the United States Bureau of Public Roads and possibly other agencies, with a view to working out a solution of the question along national lines.

The subject of Mr. Wasser's address will be "Highways—Their Use and Abuse." The road builders' president will discuss such questions as a more adequate width for roadways, marking roads with direction signs and numbers, gasoline filling stations, the billboard nuisance and uniform traffic rules and restrictions. At present, according to Mr. Wasser, each of the forty-eight states is operating its highways independently of the others and there is much conflict and confusion.

"I want the American Road Builders' Association," said he, "to take the leadership in promoting interstate co-operation in securing better and more uniform traffic regulations and I am sure that we can organize a movement at Chicago that will sweep the country."

Eighty-five thousand invitations to the coming good roads Congress have been sent to state, county and city officials, highway contractors, engineers and good roads advocates generally. The mayors of five thousand American and Canadian cities and three thousand county boards of commissioners, selectmen, supervisors or freeholders have each been asked to appoint five official delegates to the congress. Each exposition room has been applied for at the show to fill much more space than can be secured in the Chicago Coliseum and adjacent buildings. Excursion rates for the round trip to Chicago have been granted by all railroads.

During the congress, conventions will be held in Chicago by the Asphalt Association, the Midwest Section of the American Association of Engineers, the National Sand and Gravel Association, the National Crushed Stone Association, the Illinois Highway Contractors' Association, and the Illinois Association of General Contractors.

The entertainment to be provided during the week for delegates and visitors will include a stag party to be given Tuesday night, January 16, by the exhibitors at the show, with orchestra music, songs, dancers and boxing contests. On Wednesday evening, January 17, the annual banquet of the American Road Builders' Association will be held at the Congress Hotel. Men of national prominence will address the banquet and a high-class musical and vaudeville program will be rendered. On Thursday evening, January 18, the American Road Builders' Association will entertain delegates and visitors with a dinner party at Terrace Garden, during the performance of "The Terrace Garden Review."

## American Dunlop to Resume Manufacturing

Sir Eric Geddes, brother of the British Ambassador at Washington, will be the chairman of the board of directors of the Dunlop Tire & Rubber Corp. of America, whose factory at Buffalo has been practically idle since the war. The plant is to be at once reorganized and will resume operations with 8000 to 10,000 men. Beginning with a production of 3000 tires a day, the number will be increased until a 13,000 daily production will be reached.

Edward B. Germain, for many years a lieutenant of Charles M. Schwab, has been chosen as president. For the purpose of retiring substantially all the present indebtedness of the American company and provide additional working capital, \$15,866,700 of securities have been floated by Lee, Higginson & Co. The issues are first mortgage and collateral trust sinking fund 7 per cent convertible gold bonds.



Forrest J. Alvin

Whose resignation as general manager of The U. S. Motor Truck Co., Cincinnati, O., effective January 1, has been announced. Mr. Alvin's identification with the industry dates back to its inception. He was originally in the bicycle business with George T. Robie, in Chicago, and then went East to become general manager of the American Ever-Ready Works; later he identified himself with Wheeler-Schebler, handling their sales. Later connections were made with the Byrne-Kingston & Co., and the Kokomo Electric Co., handling Kingston products. He was also president and general manager of the New Era Engineering Co., Joliet, Ill. At another time he had charge of sales of Sears-Cross speedometers. For the past seven years Mr. Alvin has been with The U. S. Motor Truck Co. During that time he has been connected with and always interested in the numerous problems that have confronted the motor truck industry. It has been said that he personally enjoys the acquaintance of more automobile dealers, distributors and manufacturers than possibly any man in the industry.

## New Mechanical Principles Embodied in New Waukesha Engine

Featured by Economy in Performance and Fuel Consumption

The many important changes in the working mechanism of the new 4 x 5½ in. Waukesha engine reduces fuel consumption to a new level. Although the exterior appearance of the new Waukesha presents no unusual differences in construction, many new principles have been incorporated into the working parts. The sustained economy of this engine is a direct result of new aluminum pistons designed to run unusually cool, a new manifold providing better distributing facilities, a Ricardo type combustion head, high compression, radiated bearings and valve rotators, which reduce the working temperatures of the valves to a lower degree than the hottest point of a valve head not equipped with rotators. Economy tests of the new engine held recently by the company showed a remarkably low fuel consumption. The tests show that it is capable of 110 ton-miles per gallon of gasoline. Another important feature assuring effective lubrication of the valve stems are the oil holes drilled in the horizontal wall over the camshaft separating the crankcase from the valve chamber. This causes a stream of oil to be pumped, through the activity of the pistons, into the chamber keeping the stems thoroughly lubricated.

To further test the engine a truck of eight tons gross weight equipped with this engine was taken out on a road test under very unfavorable road conditions, there being six inches of snow on the ground. Special attention was given in the selection of the body equipment to secure one that would experience more than the average wind resistance on trucks of this capacity and require greater tractive effort on the part of the truck on account of the constant shifting of the body. The route selected was over hard surfaced, but snow covered roads, about 8 miles out from the factory and return.

At one point the grade approximated 9 per cent. The wind was blowing about 18 m.p.h. head-on for half the test. The truck attained a maximum speed of 17½ m.p.h. and negotiated the 9 per cent grade without a change of gear ratio at about 10 m.p.h. This performance gave a ten-mile result of 62.4. It is quite evident that under more favorable weather conditions the promised 100 ton-miles and more would have been accomplished. No difficulty of any kind was experienced from overheating, nor was the radiator refilled during the test.

The San Joaquin Valley Draymen's Association, which is composed of motor truck operators in the San Joaquin Valley district of California, is endeavoring to improve highway conditions for the benefit of the traveling public. It is conducting a campaign for courtesy, proper tire equipment and efficient loading.

Absolutely NEW  
Radically DIFFERENT  
Unquestionably SUPERIOR

# ROSS

## Cam & Lever Steering Gear

Patent Pending

A Notable Advance  
in Steering Design



*Adapted for*  
Passenger Cars  
Motor Trucks  
Motor Buses  
Fire Trucks  
and  
Tractors

Embodying a new and higher conception of service, this new Ross model establishes a distinctly higher standard of steering gear efficiency. Though surprisingly small in size and wonderfully simple in construction, it employs a leverage so powerful that its efficiency is even greater than that of the screw and nut type on which Ross reputation has been built.

The cam and lever design offers a unique accelerated action in operation which facilitates quick handling in making turns and in swinging back into flat-to-the-curb parking position. It is so irreversible, that practically all road shock is eliminated and the car holds the road with the least effort on the part of the driver.

This new gear offers all that the Ross steering gear has ever offered—and more—safety, reliability, and the easiest kind of steering under all conditions.

*Every manufacturer of automotive vehicles in which a steering gear is used owes it to himself and his trade to investigate this new gear. Write us for any further information desired.*

**ROSS GEAR & TOOL COMPANY**  
760 Heath St., Lafayette, Indiana, U.S.A.

The actuating cam is similar in appearance to a single thread screw of variable pitch. When the cam is turned the diamond stud projection on the inner side of the lever moves up or down, rotating trunnion shaft and steering arm. In mid-position the motion is slow, but as the pitch increases, the motion increases constantly and rapidly toward either extreme.

The gear is compact, small and light, exceedingly simple, with very few parts. The long lever arm inside the gear provides powerful efficiency with remarkably easy steering. The gear is assembled with shims to provide perfect adjustment. It is oil tight and oil lubricated. Steering wheel, spark and throttle are of the latest and most refined type.

Manufactured in different sizes to meet the requirements of any passenger car, motor truck, motor bus, fire-truck or tractor.

*The Ross screw and nut steering gear is used as standard equipment by 181 motor truck manufacturers.*

# ROSS STEERING GEARS

THE STEERING GEARS THAT PREDOMINATE ON MOTOR TRUCKS

## Firestone Report Shows Good Business

With the lowest prices experienced in the history of tire making, and in the face of keenest competition, the Firestone Tire & Rubber Co.'s sales for the fiscal year, ending October 31, were \$64,507,301.77, representing an increase of 23 per cent in pieces sold over the previous year, according to a statement made today to stockholders at their annual meeting by Harvey S. Firestone, president of the company.

The company's earnings, after providing for depreciation, interest, taxes and other charges, were \$7,348,421.59. After payment of preferred dividends and miscellaneous charges there was shown a net increase of \$16 per share in the common stock equity.

The company's bank indebtedness was reduced from \$21,680,000 at the beginning of the fiscal year to \$12,775,000 at its close, meaning a reduction of nearly \$9,000,000.

During the year the Firestone Canadian Co. financed itself through the sale of a \$1,500,000 7 per cent bond issue, according to Mr. Firestone, the parent company owning the entire outstanding preferred and common stock. The Canadian plant has a present capacity of 1600 tires daily, and is so planned that additional production can readily be procured when required.

## Motor Industry a Big Factor in Railroad Revival

"Shipping of assembled automobiles from main factories and assembling plants during the past year reached the record figure of approximately 400,000 carloads, transporting 1,700,000 machines," as reported by William E. Metzger, Chairman, Traffic Committee, National Automobile Chamber of Commerce, to the directors' meeting of that association recently. In addition to this, over 750,000 machines were driven away by dealers from factories and assembling plants.

Manufactured parts will amount to about 100,000 carloads and it is not unlikely that this heavy shipping will place automobiles and parts third in the number of carloads of manufactured articles shipped on the railroads. In 1921 it ranked fourth, being exceeded only by refined petroleum, iron and steel products, and cement. Much of the refined petroleum and a considerable part of cement and iron and steel shipping, however, is the direct result of motor car manufacture and use.

18,000 new box cars with extra wide door openings, known as automobile cars, have been included in railway equipment orders during the past year, which will bring the total of such cars in service up to 111,000. Notwithstanding this, automobile car supply became inadequate to handle the heavy production. Driving over the highways increased, as did the use of open freight cars. By these expedites the product was moved with fair promptness and dealers have been kept supplied.

## Tire Production in 1921 Drops Below 1919

The Department of Commerce announces that according to reports made to the Bureau of the Census the production of establishments engaged primarily in the manufacture of rubber tires and tubes and other rubber goods was considerably less in 1921 than in 1919. The value of products reported for 1921 amounted to \$595,855,000 as compared with \$987,088,000 for 1919, a decrease of 39.6 per cent. These figures do not include the production of the establishments which manufacture chiefly rubber boots and shoes and rubber belting and hose. In 1921, 41 such establishments reported products valued at \$108,366,000; data regarding these have been given in preliminary statements issued heretofore.

The decrease in production has been accompanied by decreases in the number of persons employed, in the amount paid during the year in salaries and wages, and in the cost of materials used.

Of the 453 establishments reporting products valued at \$5000 and more in 1921, 96 were located in Ohio, 64 in New Jersey, 52 in Massachusetts, 43 in New York, 37 in Pennsylvania, 26 in Illinois, 18 in Connecticut, 17 in Indiana, 15 in California, 11 in Missouri, 9 in Michigan, 7 each in Iowa, Rhode Island and Wisconsin, 6 in Oklahoma, 4 each in Georgia, Minnesota and Texas, 3 each in Colorado, Maryland, Nebraska and Washington, 2 each in Kansas, North Carolina, Oregon, Virginia and West Virginia, and 1 each in Delaware, Kentucky, Louisiana and Utah. Ohio, the leading state in the industry in 1921, reported 50.6 per cent of the total value of products in that year.

Considerable fluctuation is noted in the number of wage earners employed in 1921. In August, the month of maximum employment, 89,290 wage earners were reported, and in January, the month of minimum employment, 56,353, the minimum representing 63.1 per cent of the maximum. The average number employed during 1921 was 76,366, as compared with 119,848 in 1919.

## Service Truck Undergoes Reorganization

Pending final reorganization of the Service Motor Truck Co., of Wabash, Ind., the factory is operating with an increasing number of orders. The reorganization work is well under way, under the direction of a creditors' committee, headed by Paul Moore, former director of sales. Moie Cook has resigned as secretary to become associated with the Indiana Truck Corp.

The plan upon which the committee is proceeding provides for the formation of a new corporation which would turn over to the old company its entire capital stock thus permitting the old company to receive all the profits of the business for the purpose of paying creditors.

## Vig-Tor Axle Secures Modern Plant

Announcement has just been made by the Vig-Tor Axle Co., of Cleveland, that they have purchased the fully equipped plant of the Forest City Machine & Forge Co., located at 5101 Lakeside Ave., Cleveland.

This plant is ideally located and equipped for the Vig-Tor Co., and they expect to begin operations about January 15, manufacturing the new Vig-Tor internal gear drive rear axle for trucks, and front axles for both commercial and passenger cars. The plant, appraised at \$750,000, is located on New York Central Railroad on land measuring 225 x 340 ft. There are two three-story buildings 40 x 70 ft. and 85 x 177 ft., a main machine building 100 x 296 ft., and three smaller structures.

The Vig-Tor Axle Co. was incorporated several months ago by experienced axle manufacturers. The company is headed by Viggo V. Torbensen, founder and formerly president of the Torbensen Axle Co., of Cleveland, and designer of the new Vig-Tor internal gear drive axle. Other officers are: A. L. Kroesen, vice-president and general manager; W. N. Jackson, treasurer, and Carl R. Harrison, secretary.

## Parts and Accessory Advertising Managers to Meet

The Advertising Managers' Council of Motor and Accessory Manufacturers' Association will hold a meeting on January 31 at Chicago, during automobile show week.

Ezra W. Clark, advertising manager of the Clark Equipment Co., is chairman of the executive committee of this Council; the other members are: S. E. Baldwin, of the Willard Storage Battery Co., Cleveland; Joseph S. Jacobs, of the American Hammered Piston Ring Co., Baltimore; J. C. McQuiston, of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, and M. Lincoln Schuster, of the M. A. M. A., New York.

The central theme of the conference will be: How can the parts and accessory manufacturers assist in the development of the "fully equipped" car and truck market?

This subject will be discussed from all angles by outstanding authorities from the various branches of the automotive industry.

In addition, there will be the usual open forum discussion on current advertising and publicity problems directly affecting the parts and accessory manufacturers. The Executive Committee believes this meeting will have considerable educational and advertising significance throughout the industry. One of the leading car manufacturers in the country will be on the program. Executives and advertising managers, representing the principal basic units and parts of the automobile, as well as general accessory lines, will also be on the program.

# Russel

MASTER OF ROAD AND LOAD

## TRUCK AXLES

### 92% Efficient—at All Speeds

Not only at high speeds, but at all speeds. When starting—going up a grade—driving thru mud or sand—the Russel Axle unfailingly delivers 92% power to the traction members.

That's the kind of day in and day out axle performance which spells better sales of your truck—if it's Russel Axle equipt.

Truck users may not know:

that the unusual quietness in operation of their Russel-equipt trucks is due to the Russel spiral bevel drive—

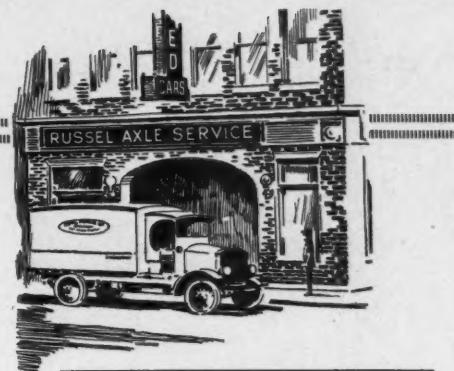
that the Russel one-piece load carrying axle provides tremendous strength at points where needed—

that the wheel gears are absolutely dust proof.

But operating cost figures soon tell users that Russel-equipt trucks are the best buy.

Specify Russel Axles—for better truck profits.

**Russel Motor Axle Company**  
Division of McCord Mfg. Co.  
DETROIT, MICH.



**Where Russel  
Coast-to-Coast Stations  
Serve Your Trade**

Harry P. Anderson Co., 5948 Second Blvd.,  
Detroit, Mich.

Sub-Dealers

T. H. Baker Truck Service and Storage Co.,  
906 Chippewa St., Flint, Mich.

Gaines Motor Sales Co., Wichita Falls, Texas

E. A. Jenkins, Columbia, S. C.

Automotive Supply Co., 219 Tuscola St.,  
Saginaw, Mich.

Buda Engine Service Co., 3923 Washington  
Ave., St. Louis, Mo.

Buda Engine Parts Co., 1055 Broadway,  
Denver, Colo.

Iowa Motor Truck Co., Ottumwa, Iowa

Northern Automotive Supply Co., 5th and

Saginaw Sts., Bay City, Mich.

Automotive Parts and Service Co., 317 Kal-

amazoo St., Lansing, Mich.

Mr. Wilbur E. Smith, 737 Bond Ave., Grand  
Rapids, Mich.

Grasser Motor Co., 16th and Madison Sts.,  
Toledo, Ohio

Stetson Motor & Supply Co., Asheville, N. C.

Sub-Stations

Auto Parts Supply Co., 1518 Grand Ave.,  
Kansas City, Mo.

Sanders Truck Co., 12th and McGavock Sts.,  
Nashville, Tenn.

Oregon Parts Co., 6th and Flanders Sts.,  
Portland, Oregon

Hayes Anderson Co., Vancouver, B. C.

Lambert Garage Sales Co., 1416 S. Los Angeles

St., Los Angeles, Cal.

Motive Parts Corp., 736 Tenth Ave., New York

Sub-Stations

Unit Parts Co., 601 Newberry St., Boston

W. B. Bearing Co., 452 N. Broad St., Newark,

N. J.

Swain-Hickman Co., 2116 Market St., Phila.

Swain-Hickman Co., Harrisburg

Motive Parts Co. of America, 2311 Indiana

Ave., Chicago

Sub-Dealers

Motive Parts Co. of America, 506 N. Delaware,  
Indianapolis

Motive Parts Co. of America, 1902 East 13th

St., Cleveland, Ohio

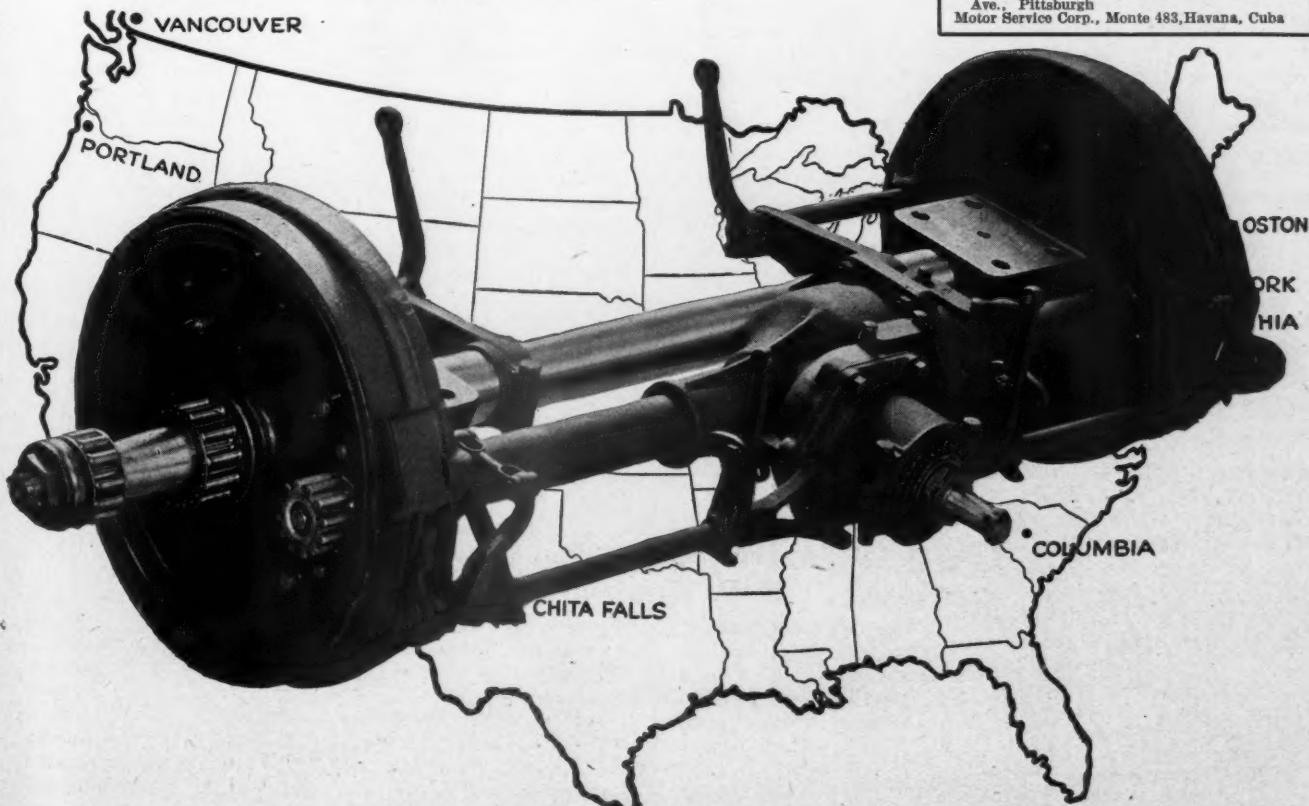
Motive Parts Co. of America, 116 E. Spring

St., Columbus, Ohio

Motive Parts Co. of Penna., 235 N. Sheridan

Ave., Pittsburgh

Motor Service Corp., Monte 483, Havana, Cuba



## Two Days' Constructive Work Planned for N. A. D. A. Convention

Business administration and other subjects of exceptional interest to automobile business men will comprise the program for the 1923 sixth annual convention of the National Automobile Dealers' Association in Chicago, January 27 to 30, inclusive. Through the year 1922 the National Automobile Dealers Association has had a corps of field men developing the one of a thousand program.

These field men have covered the entire United States in a close and thorough campaign that has given them contact with the dealers in a way that has never before been developed by any factory, by the N. A. D. A. or any other agency in the automobile industry. Through this contact the executives of the N. A. D. A. have gathered a vast fund of information. It has provided a clear picture of "What the Automobile Dealer is Thinking About."

On the basis of the information thus obtained the program of the N. A. D. A. convention has been built. The program for this 1923 meeting will be devoted entirely to the subjects which the automobile dealer has said were his most troublesome problems today. These can be largely classed under four major subjects dealing primarily and directly with merchandising.

Conditions throughout the United States, as reflected by the close contact established this year by the N. A. D. A. with the automobile merchants, indicate that 1923 will be a year in which many changes must be made in the methods of merchandising. Some suggestion of these changes will be contained in the program of the January convention.

As in former years, the railroads have made concession to the N. A. D. A. in providing special rates of fare. Certificates for the special rates must be obtained from the St. Louis headquarters of the N. A. D. A. This has been changed this year because of the difference in the membership affiliations caused by the adoption of the one of a thousand program. The membership of the N. A. D. A. embraces practically every state and there are indications that the 1923 convention will be the most largely attended of any in the history of the organization.

## Black & Decker Reduces Prices on Several Products

Following a reduction from \$39.00 to \$28.00 in the price of the Black & Decker Quarter-Inch Portable Electric Drill on November 10, the Black & Decker Mfg. Co. now announce further heavy cuts on certain popular items, which are now being manufactured in such quantities as to make the following reductions possible:

| Item                                  | Old Pr. | New Pr. |
|---------------------------------------|---------|---------|
| Quarter-Inch Drill .....              | \$39    | \$28    |
| Half-Inch Special .....               | 85      | 68      |
| Bench Drill Stand .....               | 33      | 28      |
| Post Drill Stand .....                | 36      | 32      |
| Six-Inch Electric Bench Grinder ..... | 56      | 38      |

## Tractors Added to the General Motors Truck Line

To insure the handling of the largest loads possible, the General Motors Truck Co., of Pontiac, Mich., have added three tractor models to their regular line and they will be part of the 1923 product of that company.

It has been found, executives assert, that there is a demand in all sections of the country for trucks which will haul as high as 15 tons or more, but due to state laws prohibiting the loading of trucks to this point, it was necessary to distribute the load over eight wheels to prevent damage to the highways.

This has been accomplished by the adoption of a tractor-trailer combination which spreads the load over the eight wheels and at the same time gives the business concerns of the country a product which will haul a large tonnage via motor truck.

These new models are made in the 5, 10, and 15 ton models and the tractors have been made standard units of the truck company.

The maximum load is accomplished by hooking a trailer to the rear of the specially designed tractor and, it is said, insures speed and economy of operation in the same manner that trucks are operated.

## Timken Roller Bearing Service on New Basis

Service on Timken roller bearings was placed on a new basis on January 1, when the Timken Roller Bearing Service & Sales Co. began to function. Under the new plan the servicing of Timken bearings is brought directly under the supervision of the Timken Roller Bearing Co., giving the company the same control over its service as it exercises over the sources of supply and manufacturing.

The new servicing organization functions through thirty-two direct factory branches, located as follows: Atlanta, Baltimore, Birmingham, Boston, Brooklyn, Buffalo, Cleveland, Chicago, Dallas, Denver, Detroit, Fresno, Indianapolis, Kansas City, Los Angeles, Milwaukee, Minneapolis, Newark, New Orleans, New York, Oklahoma City, Omaha, Philadelphia, Pittsburgh, Portland, Ore., Richmond, St. Louis, Salt Lake City, San Francisco, Seattle, Toronto, and Winnipeg.

In addition, the company has a country-wide organization of registered, authorized distributors in the smaller cities throughout the country.

## Union Truck Purchased by H. P. Woodworth

Howard P. Woodworth and associates have purchased the property of the Union Truck Co., Bay City, Mich., and plans are under way for an immediate resumption of manufacturing. The property was sold for an amount that will pay common creditors the remaining 65 per cent on their claims spread over a period of five years.

## Insurance Companies Revise Dealers' Rates

After six months of the competition to which casualty insurance companies of the United States have been subjected by the Insurance Service Department of National Automobile Dealers' Association, the insurance companies have revised the "Manual" rates applying to automobile dealers and garages to a point virtually 20 per cent lower than the existing rates at the time the N. A. D. A. began its struggle for lower rates for the industry. The rates are still 25 to 30 per cent higher than the rates available for members of the National Association, through their organization.

To show just what has been done in actual figures by the revision of the manual, the rates applying in the cities of New York, St. Louis and Chicago are compared by C. A. Vane, general manager of the N. A. D. A., in a statement commenting upon the association's victory for the principle for which it contended.

In St. Louis and Chicago on a public liability policy of \$5000 to \$10,000 limits and property damage of \$1000 the rates for automobile dealers were:

P. L.

For first \$10,000 payroll, \$2.50 per \$100  
For next \$15,000 payroll, \$1.90 per \$100

P. D.

For first \$10,000 payroll, \$0.95 per \$100  
For next \$15,000 payroll, \$0.70 per \$100

By this rate a dealer whose payroll was \$25,000 a year would be paying \$735 for public liability insurance of \$5000 to \$10,000 limits with \$1000 property damage. This makes an average rate of \$2.94 per \$100 of payroll. Since the revision the casualty companies have abolished the division of first \$10,000 and next \$15,000 and have authorized a flat charge of \$2.55 a hundred.

The New York rates have been reduced from an average of \$4.40 per \$100 of payroll to \$4.00 per \$100 of payroll on the basis of a payroll of \$25,000 a year. These distinctions and revisions have been made effective throughout the entire United States in about the same degree of reduction.

## Gibb Instrument to Make Pabst Welding Machines

The Gibb Instrument Co., of Bay City, Mich., has taken over, under exclusive license, the manufacture and sale of the automatic and semi-automatic electric arc welding machines developed, and heretofore manufactured by the Fred Pabst Co., of Milwaukee, under their various letters patent and have contracted to act as selling agent for the Pabst line of patented cover electrodes.

The Fred Pabst Co. has spent over two years in the development of this line of equipment, and the field of application is said to be very wide, embracing the welding of tanks, range boilers, barrels, drums and tubing.

The Gibb Instrument Co. announces its intention to encompass the entire range of electric welding equipment and this deal marks a long step in that direction.



On the radiator of every Acme is this seal of dependable performance.

Trade-Mark Registered  
U. S. and Other Countries

# Announcing the New Acme Dealer Franchise

THE dealer who today holds the new Acme Franchise has a money-making opportunity unequalled in the entire field of truck retailing.

*The franchise is ten years ahead of general practice.*

It points the way to more selling and more profit for dealers; to new ways of finding prospects, closing sales and financing deals. It meets every condition, helps solve the hardest problems.

*We are about to open some splendid territories, each of which offers a fine opportunity for an established automotive dealer or other responsible business man. Your territory may be one of them. If*

*so, we will gladly give you details of our Dealer Franchise Plan. Clip the "Reminder" coupon; then write us without delay.*

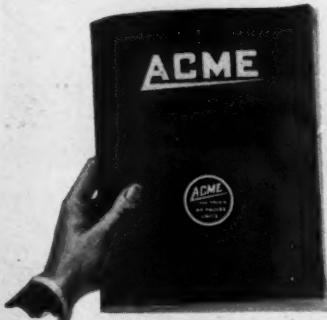
The Acme line is complete—9 distinct models, from a \$1395 completely equipped speed truck to a model of 12,500 pounds capacity.

The popularity and high reputation of the Acme are proofs of its salability and dependability. And Acme Motor Truck Company is strong and sound financially—assurance of the permanent and ever-growing value of the franchise.

Why not write us today?

**Acme Motor Truck Company**  
527 Mitchell Street

Cadillac, Mich.



**ACME**

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

**Clip This Now!**

**Reminder**

Write today to Acme Motor Truck Company, 527 Mitchell St., Cadillac, Mich., for details of Dealer Franchise Plan.

## Personal Items

**Harry L. Bill** has been made vice-president and general manager of the Owen-Dyneto Co., of Syracuse, N. Y.

**E. C. Brandt**, works manager of the Westinghouse-Krantz Works, has been appointed works manager of the new plant now being erected by the Westinghouse Electric & Manufacturing Co., Homewood, Pittsburgh.

**D. S. Campbell**, who has been associated with Tuthill Spring Co. for over 16 years, has resigned his position as secretary of the company. Mr. Campbell is one of the pioneers in merchandising and marketing automobile springs for replacement and is a member of the A. E. A. and S. A. E.

**C. Floyd Greene**, former sales manager of the Grant-Lees Gear Co., has been made general sales manager of the Lithide Manufacturing Co., Pittsburgh, Pa., manufacturer of Lithide storage batteries.

**R. B. King**, whose experience covers four years as sales promotion manager and eastern division sales manager for the Republic Motor Sales Corp., Alma, Mich., has joined the Transport Truck Co., Mt. Pleasant. He will spend part of his time at the Transport general offices and part among the distributors.

**George L. McCain**, whose work in the engineering departments of the Packard, Lincoln and Saxon companies, is widely and favorably known, has joined the engineering staff of the Link-Belt Co., for the purpose of taking care of the rapidly growing business in "front end" Silent Chain Drives. He will be located at Detroit.

**H. R. Matheny** has announced his resignation from the position of factory manager of the Winton Motor Co., Cleveland, to accept the position of director of sales with the Vig-Tor Axle Co., Cleveland. He has been identified with the industry since 1910.

**E. G. Norris**, Seattle, branch manager of the McQuay Norris Mfg. Co., of St. Louis, has been appointed Western manager of the company to cover the territory of California, Oregon, Washington, Idaho, Montana, Utah, Nevada and Arizona. His headquarters will be 314 Loew-Warfield Bldg., San Francisco.

**Frank M. Olmstead**, Oldsmobile distributor at Baltimore, has been elected treasurer of the Baltimore Automobile Trade Assn. Mr. Olmstead is also on the board of directors, on the show committee and chairman of the used car committee.

**William J. Ryan**, for six years district for the Ajax Rubber Co., Minneapolis, has

been appointed district sales manager of the Indiana territory for the Brunswick-Balke-Collender Co. His headquarters will be at the Indianapolis branch.

**William N. Shaw**, who has been president of the Eisemann Magneto Corp., of Brooklyn, N. Y., for the last four years also vice-president of the New York Air Brake Co. since 1916, has resigned the latter office in order to devote his entire time and attention to the interests of the Eisemann Corp.

## Obituary

**Herbert H. Hewitt**, well-known throughout the rubber industry as president of the Hewitt Rubber Co., Buffalo, N. Y., died on Tuesday, December 19. His death is much regretted by his many friends and associates.

**Frank Elmer Tiscornia**, vice-president of the Auto Specialties Manufacturing Co., St. Joseph, Mich., and Windsor, Canada, died at his residence in Oakland, Calif., December 23. The company announces the death of this able executive and automotive man with deep regret.



**L. S. Allen**

Whose death occurred December 27, from plural pneumonia, after a four week's illness. Mr. Allen was vice-president and advertising manager of the Rowe Motor Manufacturing Co., manufacturer of worm driven trucks, Lancaster, Pa. He was secretary of the Rowe Stuart Motors Corp., the present company, and was active in many movements for the betterment of the truck industry. The deceased was 36 years of age and is survived by a wife and two children. His death marks the passage of a type of business executive and manufacturer that is much needed in the industry and inflicts a loss to the motor truck world as well as his many friends and associates.

**Clarence F. Tollzien**, until recently and for a long term of years prominent in the organization of the Packard Motor Car Co., Detroit, has formed a connection with the Spring Perch Co., of Stratford, Conn., manufacturer of leaf springs for trucks, buses, etc. Mr. Tollzien, who enjoys an extensive acquaintance in the industry, will represent that company in Michigan and Ohio and points west, and will have headquarters in the General Motors Bldg., Detroit.

**H. V. Welles**, for the past six years sales manager of the Detroit Gear & Machine Co., transmission and clutch manufacturer, has resigned from that company to accept the position of secretary and treasurer of the Willey, of Detroit, advertising company.

**E. R. Wiggins**, former technical editor of the CHILTON TRACTOR JOURNAL, has joined the staff of the Western Advertising Agency, Racine, Wis., to engage in work connected with farm implement research and copy, covering every phase of merchandising to farmers.

## Removals and Trade Changes

**The Double Fabric Tire Co.** has changed its name to the Auburn Rubber Co., to identify the name with the product. The change in no way affects the financial standing or policies of the company, or changes its ownership in any way.

**Edward V. Hartford, Inc.**, has announced the removal of its offices at 35 Warren St., New York City, to the factory at West Side Ave. and Carbon Pl., Jersey City, N. J., thereby effecting a consolidation of all departments.

**The O. Armleder Co.** has been succeeded by the O. Armleder Motor Truck Co., as of December 30, 1922. The new corporation has the same stockholders and officers as the old, and the business will be continued as heretofore.

**Edward A. Cassidy Co.**, well-known automotive selling corporation, announces that it will discontinue business on January 1, 1923. The company was located at 25 West 43rd St., New York City.

**The Transport Motor Co.**, distributor for Transport trucks in Spokane, Wash., recently moved into imposing quarters at Sprague Ave. and Madison St. The building is three stories and is up-to-date in every respect.

**The Oxweld Acetylene Co.** announces that its Western Department, formerly located at 1077 Mission St., San Francisco, has moved to 1050 Mission St., that city.



**P. T. Hill**

Has succeeded George J. Biddings as sales manager of the Eaton Axle Co. Mr. Biddings is now sales manager of Cleveland Welding Co.



**George Sykes**

J. W. Gray, president of the Gray Tractor Co., announces Mr. Sykes as general manager of that company. He has a wide experience with both sales and manufacture of machinery.



**Charles B. Ratterman**

Has been elected president of the Ohio Automotive Trade Association as well as the Cincinnati Automotive Trade Association.



**Moie Cook**

Formerly of the Service Motor Truck Co., has acquired a substantial interest in the Indiana Truck Corp., and is to assume the title of vice-president.



**Ralph D. Mock**

Former vice-president of the Hydraulic Steel Co., has been made general manager of the Ressemer American Motor Truck Corp., which concern merged with the American Motor Corp.



## *The* TRAIL BLAZER of 1923

*A Coach Especially Designed and Built for Passenger Service*

Dealers who sell—and operators who use buses today have been waiting for a real passenger carrying coach—not a makeshift. A coach with motive power that is as free from vibration at 35 miles per hour, as at 10—with seats so arranged as to permit access to and fro with no disturbance to fellow passengers, and designed so as to give the greatest relaxation and rest while on the road.

In other words, a coach designed, engineered, built and furnished from the ground up with but one

idea in view—the carrying of passenger loads safely, comfortably, swiftly and with the greatest economy of operation and maximum life of operating units.

A coach that will demonstrate its fitness for real passenger service to you, or your customers, under the most severe conditions, conclusively.

A letter or a wire will give us the opportunity we seek of showing you the profit in *real coach sales*.

## PAR-KAR COACHES

Par-Kar Coach Company  
St. Louis Michigan



*The Approaching PAR-KAR  
Radiates Safety and Comfort*



*The Home of Comfortable  
Automotive Transportation*

# Sins of Omission With Respect to the Inventory\*

By WILLIAM N. SHAW, President Eisemann Magneto Corporation

QUICK assets are composed of cash, accounts receivable, and inventories. They are called "quick assets" because they are supposed to be capable of quick conversion into cash.

How many manufacturers and merchants realize that a dollar in the inventory requires the same amount of watching, checking and counter-checking as a dollar in the bank?

The average manufacturer is willing to pay a very good salary to the man who has charge of his bank balances, but the same man very often is unwilling to pay more than a laborer's wage to the man responsible for his inventory.

The relative descending order of immunity from shrinkage in value are: cash, accounts receivable, and inventories. In other words, a dollar in cash does not shrink in value except by reason of external economic conditions. A dollar in the accounts receivable is subject to credit losses, and experience has taught that a reasonable reserve should be created to cover these losses. The inventory, on the other hand, is subject to attack on many sides, as for instance theft, obsolescence, deterioration, actual physical shrinkage due to handling, compounding interest charges where there is an over-supply of some class of material, etc., etc.

Careful study will convince the manufacturer that the real hazard in his business, as far as his quick assets are concerned, rests not with his cash nor accounts receivable, but with his inventory, and that it will well pay him to devote the same energy, study, and foresight to his inventory that he does to his other quick assets.

What can be done to further safeguard this very volatile asset?

In the first place appoint an honest, competent, experienced man who knows the product in all its details and pay him the same salary you are paying your assistant treasurer or cashier, be it \$5,000 or \$7,500 a year; for this man has far greater opportunity to save the manufacturer money and will be required to exercise far greater discretion and intelligence than your cashier will exercise in the course of his normal duties.

The inventory supervisor should report direct to the general manager and should have under him the purchasing agent, general storekeeper, receiving clerk, and shipping clerk. All requisitions for material before going to the purchasing agent should be approved by him and only approved when he knows (a) that

the material is actually needed, (b) that no substitute for material in stock can be made, (c) how much or how little it is wise to purchase.

The inventory supervisor should be in very close touch with the selling and production departments and know as far as possible what the requirements will be for a long period ahead, to enable him to form an opinion as to the general trend of the business.

While there are variations in different businesses the usual sub-divisions of the inventory are:

- (1) Assembled Finished Material
- (2) Unassembled Finished Material
- (3) Material in Operation
- (4) Rough Basic Material
- (5) Purchased Direct Material
- (6) Purchased Indirect Material
- (7) Factory Supplies

An analysis of this list would lead us into the accounting end, which is unnecessary in connection with this particular survey.

The nature of the business would have to be known and studied before a proper ratio could be determined as to the percentage of the whole that each of the foregoing sub-divisions should carry, and only study and experience can be a guide. But a few general observations can be made.

In certain classes of work where there are frequent changes of styles the great hazard lies in the finished material, whereas in other industries the raw basic material fluctuates to such an extent that a difference of a cent a pound or a cent a yard, will mean a substantial loss or gain on the year's business.

Purchased-indirect material and factory supplies can be watched to decided advantage. It is impossible without the closest scrutiny to prevent employees from wasting, through carelessness or otherwise, large amounts of the two foregoing classifications. The average industrial employee thinks he is working for a rich concern that buys material much cheaper than he can, and consequently that it is foolish to try to economize or prevent waste.

It is presumed that the average manufacturer has some method of keeping a record of his going inventory, either by cards or book record on a unit basis or accounting methods on a dollar basis, and while these are of inestimable value the real records, of course, are based on the physical inventory, which should be taken at least annually and as much oftener as conditions will permit.

The physical inventory should be carefully analyzed and comparison made with the previous inventory, in order that the inventory supervisor and his superior officers may have an accurate picture of this division of their quick assets.

Every corporation makes up a list of old or hazardous accounts receivable, and uses every endeavor to liquidate or protect them from loss. This same thing should be done with the inventory, for only by means of a careful analysis can the weak points be brought to light and effort made to protect them.

The analysis should show (a) the number of the different units of manufactured articles in stock, (b) how many were in stock at the previous inventory taking, (c) how many were consumed or shipped during the interval, and (d) how many are on order.

This same consideration should be given to practically every unit in the entire inventory.

In the vast majority of concerns such a study as the foregoing will show many weak points that will require prompt attention, and many losses will be limited by prompt, energetic action.

The claim is made frequently by the manufacturer that his inventory is in balance, but unless his product is limited to one or two items that do not change in style from year to year it is a physical impossibility to have the inventory in absolute balance, but an intelligent inventory supervisor can do far more than keep his inventory in balance.

Losses sustained by the industrial world since 1919 have been due to a great extent to sins of omission with respect to the inventory. In no department does a greater opportunity exist for additional profits than in loss-saving management of the inventory.

## Bowman Made Vice-President of S. A. E. Frames Division

C. C. Bowman, chief engineer, Standard Motor Truck Co., Detroit, Mich., was appointed vice chairman of the Frames Division of the Society of Automobile Engineers. Mr. Bowman has been serving on the Frames Division during the past year and has given considerable time and study to the frame problem.

The Frames Division is now co-operating with the truck and frame manufacturers to adopt standard size frames for the various capacities and types of trucks. Considerable progress has already been made by this committee during the past year.

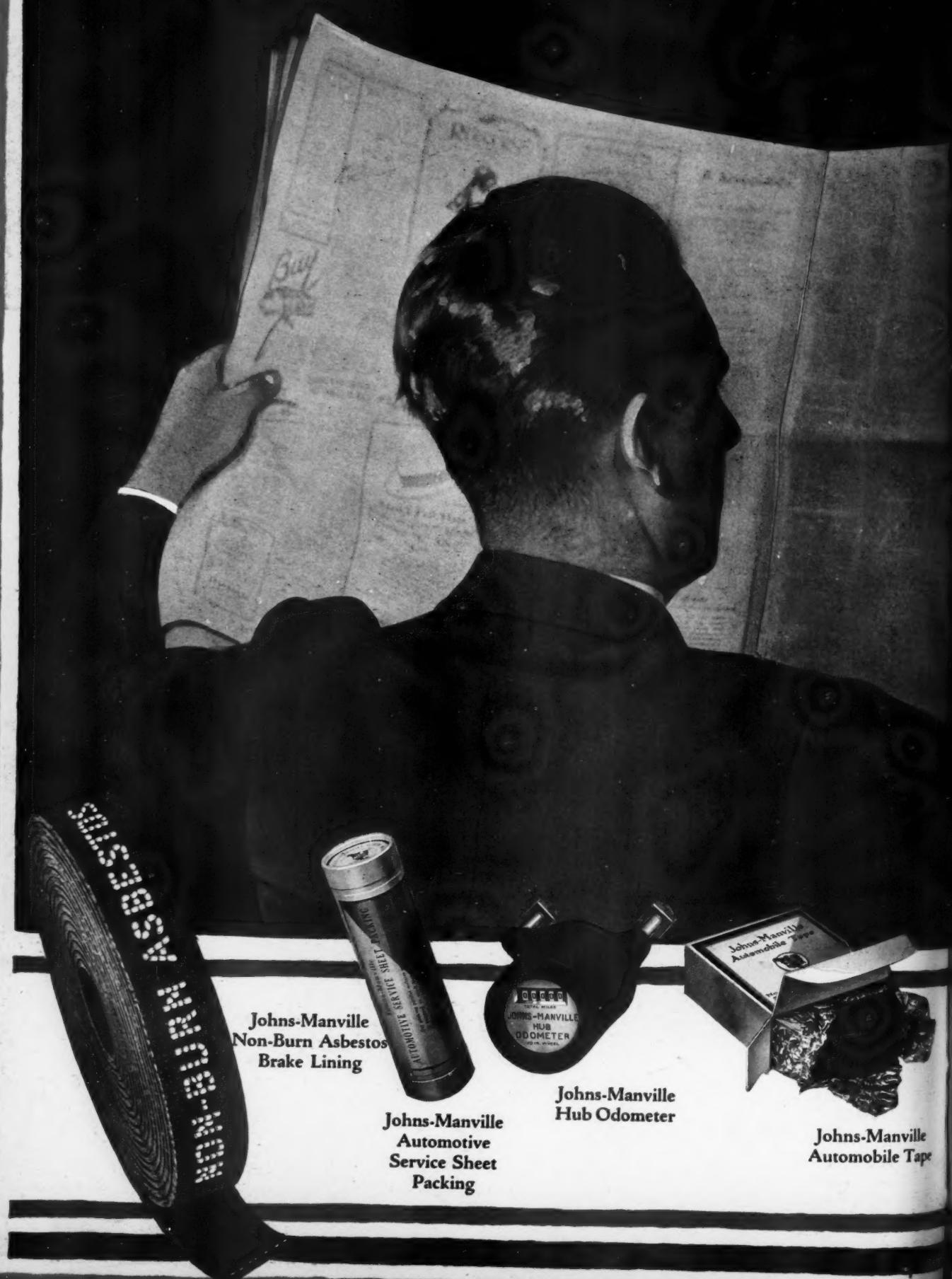
The importance of standardizing truck frames is readily apparent. The axle makers, the body builders and special equipment manufacturers have for years been seeking the adoption of uniform frame sizes. When accomplished, greater production will be possible, and production costs considerably lower.

\* Reprinted from *Forbes' Magazine*, December 28, 1922.



Announcing —  
a definite  
advertising campaign  
bearing your name  
that will cost you  
exactly —  
*nothing!*

A Johns-Manville Brake Liner





BEGINNING next month we will run a strong and effective series of newspaper advertisements in your city. Each will bear your name—if you are *then* a Johns-Manville Brake Lining Dealer. Every advertisement will carry a strong urge to motorists to drive 'round to your place *now*, and at regular intervals in the future, to have their brakes inspected. This cannot fail to bring you a great number of new customers—good customers who are always anxious to keep their cars in good condition.

You will get acquainted with them—even if they don't need relining. You can at least "ask 'em to buy" some specialty.

Get in on this. We'll get the motorist into your garage—you'll do the rest. Get in touch with your distributor today. His name appears on the next page.



Johns-Manville  
Automotive Seigelite  
Sheet Packing

Johns-Manville  
Automotive Jewett  
Ring Packing

Johns-Manville  
Speedometer for Ford Cars  
(Cat. No. 3020)

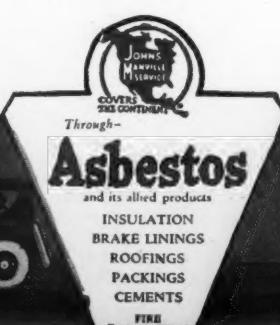
Johns-Manville Asbestos  
Clutch Facings

# CHOOSE YOUR DISTRIBUTOR

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| <b>Alabama</b>              | Moore-Handley Hardware Co., Birmingham<br>Johnson Tire & Auto Co., Montgomery  | <b>Massachusetts</b>  | Lin Scott Supply Co., Boston<br>Motor Tire Service Co., Fitchburg<br>Duncan & Goodell Co., Worcester<br>Motor Tire Service Co., Worcester   | <b>Pennsylvania—continued</b> | Berrodin Rubber Co., Philadelphia<br>Gaul Derr & Shearer Co., Philadelphia<br>Roberts Electric Supply Co., H. C., Philadelphia<br>Dyke Motor Supply Co., Pittsburgh<br>Jackson Motor Supply Co., Pittsburgh<br>General Auto Supply Co., York                                |
| <b>Arkansas</b>             | Crow-Burlingame Co., Little Rock   | <b>Michigan</b>       | Bowman Gould Co., Detroit<br>Roehm & Davison, Detroit<br>Tisch Auto Supply Co., Grand Rapids  | <b>Rhode Island</b>           | Belcher & Loomis Hardware Co., Providence   |
| <b>California</b>           | Chanslor & Lyon Co., Fresno<br>Chanslor & Lyon Co., Los Angeles<br>Featherstone, E. A., Los Angeles<br>McCoy Motor Supply Co., Los Angeles<br>Waterhouse & Lester Co., Los Angeles<br>Weinstock-Nichols Co., Los Angeles<br>Chanslor & Lyon Co., Oakland<br>Weinstock-Nichols Co., Oakland<br>Kimball-Upton Co., Sacramento<br>P. W. Gavin Company, Inc., San Diego<br>Chanslor & Lyon Co., San Francisco<br>McCoy Motor Supply Co., San Francisco<br>Waterhouse & Lester Co., San Francisco<br>Weinstock-Nichols Co., San Francisco<br>California Auto Supply Co., Stockton | <b>Minnesota</b>      | Kelley-Duluth Co., Duluth<br>Minneapolis Iron Store Co., Minneapolis<br>Reinhard Bros. Co., Minneapolis<br>Williams Hardware Co., Minneapolis<br>Nicolis, Dean & Gregg, St. Paul  | <b>South Carolina</b>         | Frank Co., Inc., C. D., Charleston<br>D. W. Alderman, Jr., Inc., Florence<br>D. W. Alderman, Jr., Inc., Greenville  |
| <b>Colorado</b>             | Auto Equipment Co., Denver<br>Foster Auto Supply Co., Denver<br>Motor Accessories & Tire Co., Pueblo   | <b>Missouri</b>       | Joplin Supply Co., Joplin<br>The Faeth Company, Kansas City<br>Ayers Farmer Auto Supply Co., St. Joseph<br>Beck & Corbitt Iron Co., St. Louis<br>Fred Campbell Auto Supply Co., St. Louis<br>Geller, Ward & Hasmer, St. Louis<br>Hermann-Sanford Company, Springfield<br>Joplin Supply Co., Webb City   | <b>South Dakota</b>           | L. & L. Motor Supply Co., Sioux Falls   |
| <b>Connecticut</b>          | Hessel & Hoppen Co., New Haven<br>Motor Tire Service Co., Putnam   | <b>Montana</b>        | Northwestern Auto Supply Co., Billings  | <b>Tennessee</b>              | Southern Auto Supply Co., Chattanooga<br>The I. J. Cooper Rubber Co., Knoxville<br>Osburn-Aston & Co., Memphis<br>Auto Supply Co., Nashville<br>The I. J. Cooper Rubber Co., Nashville  |
| <b>District of Columbia</b> | National Electrical Supply Co.<br>Rubel, Chas., & Co.  | <b>Nebraska</b>       | Nebraska Buick Auto Co., Lincoln<br>Storz-Western Auto Supply Co., Omaha  | <b>Texas</b>                  | Ferris-Dunlap Co., Dallas<br>Tri-State Accessories Corp., El Paso<br>The Equipment Company of Texas,<br>Fort Worth<br>Meyer Co., Jos. F., Houston<br>The Southern Equipment Co., Houston<br>The Southern Equipment Co., San Antonio<br>McCauley-Ward Motor Supply Co., Waco |
| <b>Florida</b>              | Baughman Company, G. Norman,<br>Jacksonville<br>Baughman Company, G. Norman, Miami<br>Baughman Company, G. Norman, Tampa   | <b>Nevada</b>         | Nevada Auto Supply Co., Reno  | <b>Utah</b>                   | Inter-Mountain Electric Co., Salt Lake City<br>Motor Mercantile Co., Salt Lake City   |
| <b>Georgia</b>              | Alexander-Seewald Co., Atlanta<br>Osburn-Aston & Co., Atlanta<br>Cody Co., W. E., Columbus   | <b>New Hampshire</b>  | Thompson & Hoague Company, Concord  | <b>Virginia</b>               | Owens-Merritt, Danville<br>Piedmont Hardware Co., Danville<br>Crump Co., Ben. T., Richmond<br>Talman Auto Supply Co., Richmond<br>Meadows-Price Co., Roanoke  |
| <b>Illinois</b>             | Automobile Supply Co., Chicago<br>Chicago Automobile Supply House,<br>Chicago<br>Motor Car Supply Co., Chicago<br>Sheridan Auto Supply Co., Chicago<br>Tenk Hardware Co., Quincy<br>Washington Auto Supply Co., Washington   | <b>New Jersey</b>     | Economy Auto Supply Co., Newark<br>Pruden Hardware Co., Newark  | <b>Washington</b>             | Chanslor & Lyon Co., Seattle<br>Reynolds & Reynolds, Seattle<br>Chanslor & Lyon Co., Spokane<br>Holley-Mason Hardware Co., Spokane<br>Chanslor & Lyon Co., Tacoma<br>Reynolds & Reynolds, Tacoma  |
| <b>Indiana</b>              | Orr Iron Co., Evansville<br>Lomont & Co., Ft. Wayne<br>The I. J. Cooper Rubber Co., Indianapolis<br>Goodlin Auto Equip. Co., South Bend  | <b>New York</b>       | Albany Hardware & Iron Co., Albany<br>Martin-Evans Co., Brooklyn<br>H. D. Taylor Co., Buffalo<br>Barker, Rose & Clinton Co., Elmira<br>Weaver-Ebding Co., New York City<br>Pruder Hardware Co., W. E.,<br>New York City<br>Whittemore-Sim Co., Inc.,<br>New York City   | <b>West Virginia</b>          | Williams Hardware Co., Clarksburg   |
| <b>Iowa</b>                 | Cedar Rapids Pump Co., Cedar Rapids<br>Sieg Co., Davenport<br>Herring Motor Co., Des Moines<br>Repas Auto Co., Waterloo  | <b>North Carolina</b> | Carolinias Auto Supply House, Charlotte<br>Automobile Supply Co., Wilmington  | <b>Wisconsin</b>              | Clemens Auto Supply Co., Eau Claire<br>Andrae & Sons Co., Julius, Milwaukee<br>Shadolt & Boyd Iron Co., Milwaukee<br>Tisch Auto Supply Co., Milwaukee<br>Western Motor Supply Co., Milwaukee  |
| <b>Kansas</b>               | The Frank Colladay Hardware Co.,<br>Hutchinson<br>Watson-Weldon Co., Salina<br>Southwick Auto Supply Co., Topeka<br>Massey Hardware Company, Wichita   | <b>North Dakota</b>   | Grant-Dadey Company, Fargo  | <b>Wyoming</b>                | Auto Equipment Co., Casper  |
| <b>Kentucky</b>             | Peaslee-Gaulbert Co., Louisville   | <b>Ohio</b>           | The Penn. Rubber & Supply Co., Akron<br>C. & D. Auto Supply Co., Cincinnati<br>The I. J. Cooper Rubber Co., Cincinnati<br>The Penn. Rubber & Supply Co.,<br>Cincinnati<br>The Penn. Rubber & Supply Co.,<br>Cleveland<br>The I. J. Cooper Rubber Co., Columbus<br>The Penn. Rubber & Supply Co.,<br>Columbus<br>Justus & Parker Co., Columbus<br>The I. J. Cooper Rubber Co., Dayton<br>The Penn. Rubber & Supply Co., Toledo<br>The Penn. Rubber & Supply Co.,<br>Youngstown | <b>Alberta</b>                | The Motor Car Supply Co.,<br>of Canada, Ltd., Calgary<br>The Motor Car Supply Co.,<br>of Canada, Ltd., Edmonton   |
| <b>Louisiana</b>            | Shuler Auto Supply Co., New Orleans<br>Cupples-Lonergan, Inc.,<br>Shreveport   | <b>Oklahoma</b>       | Sherwin Tire & Supply Co., Oklahoma City<br>Joplin Supply Co., Tar River<br>Racing Tire Co., Tulsa<br>Machinery & Supply Co., Tulsa   | <b>British Columbia</b>       | Wood, Vallance & Leggat, Ltd., Vancouver  |
| <b>Maine</b>                | The Farrar-Brown Company, Inc.,<br>Portland  | <b>Oregon</b>         | Wiggins Company, Inc., Portland<br>Chanslor & Lyon Co., Portland<br>Waterhouse & Lester Co., Portland   | <b>Manitoba</b>               | Wood, Vallance, Ltd., Winnipeg  |
| <b>Maryland</b>             | Auto Supply Co., Baltimore<br>Coggins & Owens, Baltimore   | <b>Pennsylvania</b>   | Motor Accessories Co., Allentown<br>Central Motor Supply Co., Altoona<br>The Penn. Rubber & Supply Co., Erie<br>Front Market Motor Supply Co.,<br>Harrisburg<br>General Auto Supply Co., Harrisburg<br>Johnstown Auto Co., Johnstown<br>General Auto Supply Co., Lancaster<br>The Penn. Rubber & Supply Co., Oil City   | <b>New Brunswick</b>          | Lounsbury Company, Ltd., Newcastle  |
|                             |  |                       |   | <b>Nova Scotia</b>            | J. J. Snooks Ltd., Truroo   |
|                             |  |                       |   | <b>Ontario</b>                | Whites, Limited, Collingwood<br>Nicholson Sales & Service Co., Hamilton<br>A. Chown Company, Kingston<br>James Cowan, London<br>Just Motors Limited, Ottawa<br>Samuel Trees & Company, Toronto<br>Bowman Anthony Co., Windsor   |
|                             |  |                       |   | <b>Saskatchewan</b>           | Wood, Vallance, Limited, Regina   |

JOHNS-MANVILLE Inc., Madison Avenue at 41st Street, New York City

Branches in 56 Large Cities  
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# Battery Ignition Made Slight Gain Last Year

By C. P. SHATTUCK

**A** REVIEW of the trend in ignition for the past seven years, based on models and specifications in the COMMERCIAL CAR JOURNAL, shows that battery ignition increased in 1922 by 1.6 per cent. A year ago the magneto manufacturers said that the gain, if any, for 1922, would not be large. On the other hand, the battery ignition makers claimed that each year would show a steady gain. The fluctuations are given in the following table:

| Year | Per Cent<br>Battery | Per Cent<br>Magneto | Models |
|------|---------------------|---------------------|--------|
| 1916 | 3.5                 | 96.5                | 593    |
| 1917 | 2.8                 | 97.2                | 535    |
| 1918 | 10.3                | 89.7                | 312    |
| 1919 | 9.2                 | 90.8                | 553    |
| 1920 | 9.5                 | 90.5                | 568    |
| 1921 | 8.8                 | 92.2                | 629    |
| 1922 | 10.4                | 89.6                | 669    |

In analyzing the figures it will be seen that magnetos gained slightly in 1917, but that battery ignition gained 7.5 per cent the following year, which is claimed to have been due to production conditions. Magnetos gained 1.1 per cent in 1919, and .3 per cent in 1920. In 1921, the per cent of battery equipped models was reduced to 8.8, but in 1922 it rose to 10.4, or .1 greater than 1918. This would tend to substantiate the claims of the battery ignition makers made last year.

## Greatest Gain in Lighter Models

In analyzing the ignition equipment by models and capacities for 1922, 1000 lb. to 7 tons, inclusive, and comparing it with the preceding year, battery ignition has gained in the 1000 lb., 1500 lb., 1, 1 1/4, 1 1/2, 3 1/2 and 5 1/2 to 7 tons. There is no change

insofar as percentages are concerned in the 2, 2 1/2 and 4-ton classes. The magneto shows a slight gain in the 3 and 5-ton class. Carrying the analysis still further we find that the gains for the battery are more pronounced in the 1500 lb., 1-ton and 1 1/2-ton class where there is volume production. In commenting upon the gains in these classes in 1921, the writer said a year ago: "If the figures quoted mean anything the gain in battery ignition in the 1500 lb., 1, 1 1/4 and 1 1/2-ton classes, and increases in the 2 and 2 1/2-ton models, they can be interpreted to indicate that 1922 and thereafter will see further gains for the battery advocates and gains where there is volume production."

Last year the gain for battery ignition in the 1500 lb. class was 4.5 per cent; 1-ton, 10.6 per cent; 1 1/4-ton, 3.7 per cent; 1 1/2-ton, 2.2 per cent; 3-ton, 2.6 per cent; 3 1/2-ton, 2 per cent; 5 1/2 to 7-ton, 5.9 per cent. In the last named class the magneto maker has had a clear field until last year. But it is only fair to state that the percentage figure is misleading to a certain extent, for only one of the 16 models is battery equipped. The percentages in the 2, 2 1/2 and 4-ton classes remain the same as in 1921. Magnetos have gained 2.6 and .2 per cent in the 3 and 5-ton classes.

## Production and Increases

A study of the table of percentages, and eliminating the factor of production, should not occasion any great worry to the magneto manufacturers, for during the past seven years the gain by the battery ignition makers has been but 6.5 per cent. There is this to be considered, however,

that if the analysis were prepared on production by models, the figures might not be so interesting to the magneto makers. Such data is not presented, however, as reliable and dependable production figures and dealing with each model and make, are not easily obtained.

The magneto continued to predominate in the heavier capacity models, particularly where solid tires are employed. It appears that truck manufacturers are not yet convinced that

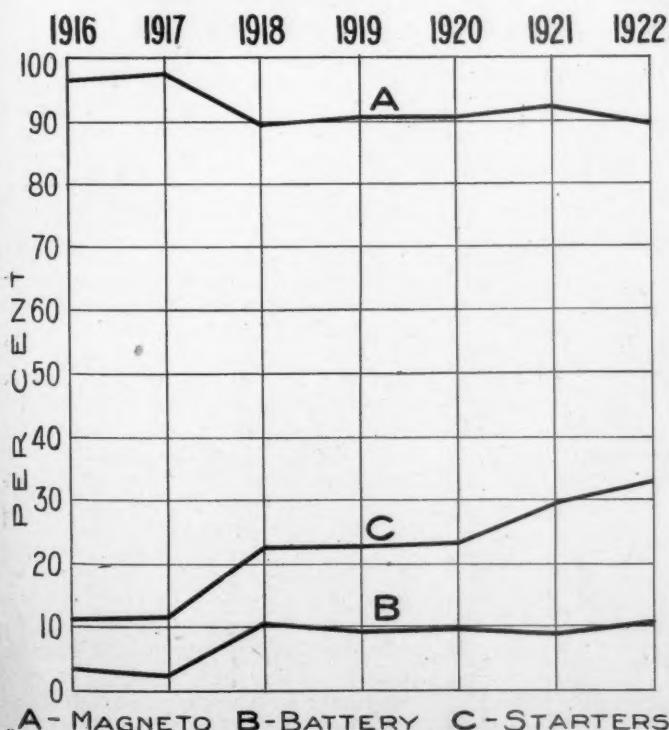
the storage battery is dependable on the heavier models without pneumatic tires. Some battery makers will take exception to this statement, but figures tend to prove the contention. Perhaps the battery engineer will develop a type of battery which will meet the requirements of heavy trucks, but until this is done it is not believed that the battery ignition will make any worth while gains in the heavier capacity trucks.

It is believed by those in touch with the equipment situation that the gain made by the battery ignition makers is largely due to the increasing use of pneumatics and the electric starter. The use of the electric starter requires a battery and the source of current supply, a generator. The use of starters in the truck field increased from 29.8 per cent in 1921, to 33 per cent last year, or a gain of 3.2 per cent. In 1916, 11.3 per cent of the models were equipped with a starter and the following year the gain was but .6 per cent. In 1918, 22.6 per cent of the models had starters and in 1919 the gain was but .1 per cent. With the exception of the year of 1918, when the gain was 10.7 per cent, the increase in favor of the starter has not been as pronounced as might be thought.

This year may witness an increase in the use of starters, but whether or not this will mean a greater use of battery ignition remains to be seen. It is very probable that there will be a slight gain in battery ignition. Magneto makers do not believe it will amount to anything. On the other hand, the advocates of the battery ignition claim that there will be a steady gain in 1923 and thereafter.

## Requirements of Truck Generators

O. L. Harrison, sales manager of the Dayton Engineer Laboratories Co., maker of the Delco ignition, starting and lighting systems, says: "If a truck is to be equipped with starting and lighting there is no reason why it should not be equipped with the battery type of ignition. The generator problem is one requiring very careful consideration on trucks because of the varying service. Some are operated in municipal work at about four and five m.p.h. and travel short distances. This means a generator must be designed which will begin delivering current as soon as the engine starts turning over, and the current must be of sufficient capacity to take care of the ignition, as well as keeping the battery charged. On the other hand, the truck may be driven entirely during the day and the requirements of the generator less. Other chassis may operate mostly at night and the requirement may be 20 to 25 amperes. After a great amount of experimental work we have the generator situation straightened out so that it is very satisfactory."



# Tabular Data of Value to Truck Salesman

**T**RANSPORTATION salesmen today equip themselves with every item of ammunition collectable.

Experience has taught them the value of furnishing the user or prospect with information immediately upon request. Whether it is presented from notebook or from the more facile storehouse of facts, the mind, the prospect through appreciation of your knowledge becomes more receptive to your sales talk; confidence is created.

No particular rule may be applied to determine just what questions prospects may bring forth. No one can anticipate the whims and fancies of another. But the possibilities of having a question asked that would ordinarily stump the salesman through lack of familiarity with the prospect's vocation can be materially reduced by being prepared for the unexpected. There is but one rule: Ensemble all data available relative to the prospect's business and you will be sufficiently posted on the subject to render a service by giving the intelligent advice the prospective purchaser expects.

To provide the salesman with tabular data of value to him in his relations with contractors, road builders, or haulers of raw products we are offering the following few tables.

It is of importance for the user of motor trucks to know just how much his truck should carry with an average load of different commodities.

## METALS

|             | Per Cu. Ft. |
|-------------|-------------|
| Iron, Cast  | 450         |
| Steel       | 490         |
| Aluminum    | 165         |
| Brass, Cast | 510         |
| Copper      | 550         |
| Lead        | 710         |

**NOTE.**—Many users of tables confuse the above figures with weights of ore from which the metals are derived. Except in the case of Minnesota iron ore and certain other exceptions, the percentage of metal in ores is relatively small. Most ores run less than 20 per cent heavier than ordinary stone.

## COAL, COKE, ETC.

|                                    | Pounds per Cubic Yard |
|------------------------------------|-----------------------|
| Ashes—from hard coal               | 700-1000              |
| Ashes—from soft coal, with clinker | 1000-1500             |
| Charcoal—Hardwood                  | 500-525               |
| Charcoal—Pine                      | 475-500               |
| Cinders                            | 1200-1400             |
| Coke                               | 700-800               |
| Coal—                              |                       |
| Anthracite                         | 1400-1700             |
| Cannel                             | 1300-1400             |
| Poocahontas                        | 1400-1800             |
| "Soft Coal"—                       |                       |
| Lump                               | 1400-1600             |
| Mine Run                           | 1400-1600             |
| Screenings                         | 1300-1600             |
| Washed Coal                        | 1300-1400             |

## FARM PRODUCTS

1 Bushel = 1 1/4 Cubic Feet.  
Pounds Per Bushel

|               |    |
|---------------|----|
| Barley        | 48 |
| Bran          | 20 |
| Corn, Shelled | 55 |
| Corn, In Ear  | 70 |
| Oats          | 32 |
| Rye           | 56 |
| Wheat         | 60 |
| Potatoes      | 60 |
| Beets         | 60 |
| Beans, dry    | 60 |
| Peanuts       | 22 |

**Editor's Note**—Some of the information has been obtained through the courtesy of the Lee Loader Body Co., Chicago, Ill.

## BULK MATERIALS

|                    | 1 Cu. Yd.   | 2-Ton   | 5-Ton   |
|--------------------|-------------|---------|---------|
|                    | Lb.         | cu. yd. | cu. yd. |
| Asphalt            | 2,300       | 1.6     | 4.0     |
| Brick, soft        | 2,700       | 1.48    | 3.7     |
| Brick, common      | 3,000       | 1.33    | 3.3     |
| Brick, hard        | 3,375       | 1.18    | 2.9     |
| Brick, pressed     | 3,650       | 1.09    | 2.7     |
| Brick, fire        | 3,900       | 1.03    | 2.6     |
| Cement, Portland   | 1,620       | 2.47    | 6.2     |
| Cement, Rosendale  | 2,100       | 1.90    | 4.7     |
| Clay               | 3,200       | 1.25    | 3.1     |
| Coal, lump         | 1,875       | 2.13    | 5.3     |
| Coal, broken       | 1,782       | 2.24    | 5.6     |
| Coal, egg          | 1,753       | 2.28    | 5.7     |
| Coal, stove        | 1,736       | 2.3     | 5.7     |
| Coal, chestnut     | 1,693       | 2.4     | 5.9     |
| Coal, pea          | 1,646       | 2.43    | 6.1     |
| Coal, Bituminous   | 1,500       | 2.66    | 6.7     |
| Coal, Cumberland   | 1,450       | 2.76    | 6.90    |
| Coal, Cannel       | 1,360       | 2.94    | 7.35    |
| Coke               | 860         | 4.65    | 11.63   |
| Earth, in bank     | 2,500-3,000 | 1.33    | 3.33    |
| Earth, dry         | 2,000-2,500 | 1.86    | 4.65    |
| Earth, loose       | 2,000       | 2.0     | 5.0     |
| Gravel, in bank    | 2,300-3,000 | 1.33    | 3.33    |
| Gravel, dry        | 2,000       | 2.0     | 5.0     |
| Gypsum             | 3,800       | 1.05    | 3.63    |
| Lime, quick, bulk  | 1,400       | 2.86    | 7.14    |
| Mortar             | 2,400       | 1.67    | 4.16    |
| Mud, soft, flowing | 2,900       | 1.41    | 3.53    |
| Pitch              | 1,950       | 3.05    | 5.13    |
| Plaster of Paris   | 2,100       | 1.90    | 4.76    |
| Quartz, broken     | 2,700       | 1.48    | 3.70    |
| Sand, dry          | 2,300-3,160 | 1.85    | 4.63    |
| Sand, wet          | 2,500-3,200 | 1.25    | 3.12    |
| Stone, crushed     | 2,300-3,000 | 1.85    | 4.63    |
| Tile               | 3,000       | 1.33    | 3.33    |
| Trap Rock          | 4,600       | 0.87    | 2.17    |

## ADDITIONAL BUILDING AND PAVING MATERIALS

|                           | Sizes in Inches                  | Weight per Thousand |
|---------------------------|----------------------------------|---------------------|
| Brick, soft               | 2 1/4 x 4 x 8 1/4                | 4,320               |
| Brick, common             | 2 1/4 x 4 x 8 1/4                | 5,400               |
| Brick, hard               | 2 1/4 x 4 x 8 1/4                | 6,480               |
| Brick, paving block       | 3 1/4 x 4 x 8 1/2                | 8,750               |
| Cement, Portland, 96 lbs. | per Sack.                        |                     |
| Lime, per bushel          | 75 lbs.; per cubic foot, 55 lbs. |                     |
| Stone, Solid—             |                                  | Per Cubic Ft.       |
| Granite                   |                                  | 170                 |
| Limestone                 |                                  | 166                 |
| Marble                    |                                  | 165                 |
| Sandstone                 |                                  | 151                 |
| Shale                     |                                  | 162                 |
| Slate                     |                                  | 175                 |
| Trap                      |                                  | 187                 |
| Gypsum                    |                                  | 142                 |
| Concrete                  |                                  | 150                 |
| Mortar, lime, hard        |                                  | 103                 |

## LUMBER

NOTE.—1,000 feet B. M. in sixteen-foot lengths makes a pile roughly 6 feet wide and 1 foot high.

|               | Weight per 1000 feet B. M. |
|---------------|----------------------------|
| "Commercially |                            |
| HARD WOODS    | Dry" Green                 |
| Black Ash     | 3,200 4,600                |
| White Ash     | 3,800 4,600                |
| Basswood      | 2,500 4,200                |
| Beech         | 4,000 5,750                |
| Birch         | 4,000 5,550                |
| Butternut     | 2,500 4,000                |
| Cherry        | 3,800 5,000                |
| Chestnut      | 2,800 5,000                |
| Cottonwood    | 2,800 4,600                |
| Cypress       | 3,000 5,000                |
| Elm, Rock     | 4,000 5,400                |
| Elm, Soft     | 3,100 4,750                |
| Gum, Red      | 3,300 5,400                |
| Gum, Sap      | 3,000 5,000                |
| Hickory       | 4,500 6,000                |
| Locust        | 3,500 4,800                |
| Mahogany      | 3,500 4,500                |
| Maple, Hard   | 3,900 5,400                |
| Maple, Soft   | 3,300 5,000                |
| Oak           | 4,000 5,500                |
| Poplar        | 2,800 3,900                |
| Sycamore      | 3,000 4,750                |
| Walnut        | 3,800 4,900                |
| Willow        | 2,800 4,200                |

## WEST COAST WOODS

|                |       |       |
|----------------|-------|-------|
| Douglas Fir    | 2,500 | 3,500 |
| Western Spruce | 2,100 | 3,300 |
| Redwood        | 2,200 | 3,300 |
| Cedar          | 2,200 | 3,000 |

## SOUTHERN AND EASTERN WOODS

|                          |       |       |
|--------------------------|-------|-------|
| Southern Long Leaf Pine  | 3,400 | 4,500 |
| Southern Short Leaf Pine | 3,300 | 4,000 |
| Cypress                  | 3,000 | 5,000 |
| Hemlock                  | 2,100 | 3,500 |
| Spruce and Eastern Fir   | 2,100 | 3,000 |
| White Pine               | 2,100 | 3,900 |

## BALED FARM PRODUCTS

|                         | Bale in Inches         | Weight in Pounds |
|-------------------------|------------------------|------------------|
| Cotton, Standard bale   | 27x27x54               | 500              |
| Cotton, Compressed bale | 25x25x54               | 500              |
| Hay, Standard bale      | 17x22x43               | 115              |
| Hay, Small bale         | 14x16x43               | 85               |
| Straw, Standard bale    | 17x22x43               | 100              |
| Hay, stacked            | 500 cubic feet per ton |                  |

Sizes of bales of hay and straw vary according to locality and the type of baler used.

## GROCERIES, ETC.

|                | Dimensions of Barrel                      |
|----------------|---|
| Bilge          | Diameter Height                           |
| Diameter       | Weight Lbs.                               |
| Flour          | 21 in. 28 1/2 in. 196                     |
| Salt, Syracuse | 21 in. 29 in. 280                         |
| Sugar          | 25 in. 30 in. 360                         |
| Apples         | (3 bushels) 180                           |
| Ice            | 57 1/2 lbs. per cubic foot                |
| Standard block | measures 11" x 22" x 44"; weighs 350 lbs. |

## LIQUIDS

|             | Gallons Per Bar'l | Weight Per Bar'l | Per Gal. |
|-------------|-------------------|------------------|----------|
| Fuel Oil    | 55                | ...              | 7.3      |
| Gasoline    | 55                | ...              | 6.5      |
| Kerosene    | 55                | ...              | 7.0      |
| Linseed Oil | 50                | 400              | 7.6      |
| Milk        | 50                | ...              | 8.7      |
| Molasses    | 50                | 650              | 10.0     |
| Tar         | 51                | 425              | 8.3      |
| Turpentine  | 51                | 425              | 7.3      |
| Vinegar     | 48                | 425              | 8.4      |
| Water       | ...               | ...              | 8.3      |
| Milk        | ...               | ...              | 10.0     |

One 10-gallon milk can weighs, full, 115 lbs.; empty, 28 lbs. Measures 26" high, 14" diameter. One case of 12 quarts weighs, full, 63 lbs.; empty, 33 lbs. Measures 18 1/4 x 14 1/4 x 12. One case of 20 pints weighs, full, 54 lbs.; empty, 33 lbs. Measures 18 1/4 x 14 x 10. Street Sweeping, 850 lbs. per cubic yard.

## MISCELLANEOUS

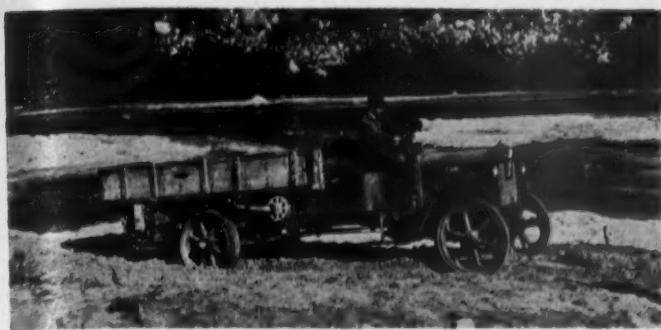
Garbage, "Dry," 900-1100 lbs. per cubic yard. Garbage, Wet, 1100-1400 lbs. per cubic yard. Paper, newspaper rolls, weight, 1200 lbs.; length, 72"; diameter, 32".

**Battery Book Brought Out by Ambu Engineering Institute**

The American Bureau of Engineering, Inc., 2632 Prairie Avenue, Chicago, has just issued its 1922 edition of "The Automobile Storage Battery—Its Care and Repair." This book is literally a gold mine of information and should be in the hands of all who in any way handle batteries.

The book can be used in many fields of automotive work. The automobile mechanic will find it useful in obtaining information regarding a unit he is compelled to work with; the battery repair man can find there, the details of construction of various makes of storage batteries; the battery service station owner will find the chapters on service station and equipment useful; any shop owner can profit by it, as the book gives in detail the most efficient yet simplest methods of handling shop records, etc., and the farmer can use it to advantage if he operates a farm-lighting plant and wants to get the most out of his batteries.

The language is simple and clear, minute details are given when necessary, yet the reader is never burdened with unessential.



Left: Leaving the River, Going Up Grade, an Exceedingly Soft Spot Was Struck. Right: The Water Served Merely to Improve the Going

## New Device Gives Trucks More Traction

WHEN motor trucks operate around lumber camps, in the oil fields, on farms, or any place where the going is soft, sandy or rough, adequate traction is always a big problem. Many serious delays have resulted from the wheels of a big truck digging into soft earth and stalling the vehicle with its load. On farms especially, the motor truck has been handicapped, because it could not be loaded in the field and driven out without having difficulty in securing adequate traction in the soft earth of the fields with its heavy load.

A new invention just perfected is designed to overcome these handicaps. It is a tracklaying device for attaching to the drive wheels of motor trucks wherever they must negotiate difficult places. It is known as the "Truck-Track," and was invented by Charles F. Ball, Santa Ana, Cal., who was formerly chief engineer for the Holt Caterpillar Co.

The new device consists of a series of link pads similar to the tracks used on crawler tractors. The track made up of these link pads is fitted around the tire of the motor truck's drive wheel in the manner shown in the accompanying illustrations. In addition to the track there is an idler wheel attachment, by means of which the traction surface is increased and the track held tightly against the face of the truck wheel. The pressure of this idler wheel between the truck tire and the track can be increased or decreased by adjusting a nut with a wrench.

With one of these attachments on each drive wheel the motor truck has a traction equipment that will enable it to negotiate with a heavy load in soft sand, in snow, in mud, and even through the bed of a river. In a test recently conducted near Los Angeles, a 2½-ton GMC truck with a 3-ton load was equipped with this attachment and it successfully operated over plowed ground, in deep mud and through the sand bed of the Los Angeles River.



The Track Partly Pulled Over the Wheel and Commencing to Go Underneath, Thus Creating a Firm Roadway



Drawing the Links of the Track Tight and Into Proper Position



Pulling the Track Over the Idler and Wheel for Attaching in Position



The Track Completely Enveloping the Wheel



Close-up of the Rear Wheels, Showing Condition of Sand at Time Traction Ceased. The Truck Was "Stuck"



Making the Caterpillar Track Pull Itself Into Position



Close-up of the Soft Spot, Showing It Was Really Soft

# NEW COMMERCIAL CARS



## One-Ton Mason Road King, a New Durant Truck Product

THE Mason Motor Truck Division of Durant Motors, Inc., with plants at Flint, Mich., and Bridgeport, Conn., western and eastern distributing points, is in production with the Mason Road King, a 1-ton truck. The design is by A. C. Mason, who has been associated with W. C. Durant for many years. This truck is constructed to provide economical operation, low cost of

engine, supported at three points, can be readily displaced, and the clutch removed without disturbing engine or transmission. Accessibility and simplicity have been the objects sought for by the designer so that the small dealer may render satisfactory service.

Factors of safety are large throughout the design, the frame, bearings, springs, etc., being ample in size, and the horse-

power rating of the engine is greater than generally employed with the 1-ton chassis. The engine, an L-head type, is a 4-cylinder unit, cylinders cast in block, with a bore and stroke of 4 x 5 in. The S. A. E. rating is 25.6 hp. but will develop 40. The cylinder head is detachable. The fuel supply is by a Johnson automatic type carburetor on the right side of engine, and carburetion is assisted by a hot spot type of exhaust and intake manifold. The igni-

tion is by battery system—the Auto-Lite—the unit being mounted at the rear and on top of the generator, which is driven by an extension of the pump shaft through a flexible coupling. Cooling is by pump, aided by a fan and an amply proportioned radiator. The adjustment of the fan belt tension is readily made.

A Hoosier multiple disk type of clutch, with 10 in. disk is employed. The unit

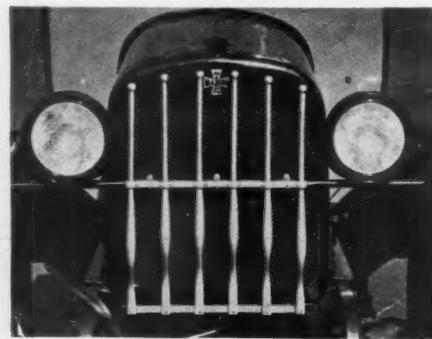


View of the All-Weather Cab and Manner of Regulating Adjustable Windshield

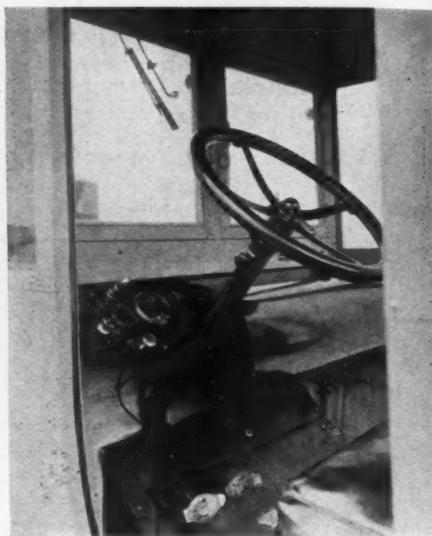
maintenance and also ability to haul heavy loads at slow speed where grades and bad roads prevail, as well as provide that speed essential to rapid delivery work. These variants are obtained by supplying as standard equipment, two gear ratios—a 4.9:1 for delivery purposes and a 5.5:1 for hilly territory.

### Simplicity and Accessibility Emphasized

Having in mind the relation of service to sales there has been incorporated in the Mason Road King those features in mechanical design which require a minimum of time when making adjustments, removing and replacing a unit, etc. The



Front View Shows Attractive Arrangement of Radiator Guards and Headlights



Arrangement of the Wheel, Controls and Dash Make for Ease in Driving

can be displaced by disconnecting the universal joint. The transmission, three reverse, is located amidship. Drive is by shaft with double universal joints. The Hotchkiss drive is employed, but a torque arm is also used.

The steering gear is of irreversible design. The spark and throttle controls are located below the wheel on the column which also carries the button of the electric horn control. Front and rear axles are Timken, having oversize bearings. The rear axle is of the full floating design with spiral bevel gears and option is given of two gear ratios. Both service and



Three-Quarter View of the New One-Ton Mason Road King  
It is the product of the Mason Motor Truck Division of Durant Motors, Inc. This particular job equipped with cab and express body lists at \$1400

emergency brakes are 3 in. in width. The service is of the external contracting type and the emergency expanding. The linkage provides maximum brake efficiency.

Front and rear springs are semi-elliptic, the front being 28½ in. long and the rear, 38¼ x 2½. Alemite lubrication is standard equipment. The frame is sturdy and its width is 30 in. The overall length of the chassis is 173 in.; width overall, 66 in.; from dash to rear of frame, 130 in. The wheelbase is 131 in. and tread 66. The wheels are of artillery type equipped with heavy Firestone one-piece demountable rims. Cord pneumatics, 34 x 5-in.,

are used all around. The weight of the chassis with hood and fenders is 2950 lb. The standard equipment includes a single unit starter, storage battery, electric head lights and tail light, speedometer, ammeter, electric horn, pump, jack, and a complete set of tools.

The radiator guard is of the vertical type anchored to a cross member, which in turn is secured to the sturdy uprights carrying the headlights. The instrument board, which is mounted on the dash at an angle, carries the ammeter, speedometer, ignition and lighting switch, oil gage and the board lamp. The choke control

of the carburetor is mounted at the base of the board. The fuel supply is by gravity, the tank being cylindrical and mounted on the dash at the right. It has the usual gage in sight of the driver. The windshield of the cab is conveniently controlled from the seat. The finish is high class throughout.

The Mason Road King, chassis, lists at \$1200, f.o.b. Flint, Mich. With cab the list is \$1325. The chassis with cab and express body is \$1400, and with stake body, \$1385. It is said that the Mason Truck Division will market an 18-passenger bus at a low price.

## Federal Announces New 1923 Line

**A**N entirely new line for 1923 was announced recently by the Federal Motor Co., of Detroit. The models will include six truck chassis and two tractors, including an entirely new 2½-ton truck chassis.

The line will include the "Fast Express"; the 1 to 1½-ton unit, with pneumatic or solid tires; the new 2½-ton unit; the 3½ to 4-ton unit; the 5 to 6-ton model, and both a light and heavy duty model trailer tractor.

The new 2½-ton unit is being made in four wheelbases. They range as follows: short, 120 in.; dump chassis, 144 in.; standard length, 156 in., and long, 168 in.

A radical departure from usual motor truck construction has been made in designing this model, since it is slung much lower than the average truck. Its road clearance from the ground to the frame, when loaded, is 30½ in. This has been done to facilitate loading.

The engine in this new truck is a Continental, L head type, cast in block and capable of developing 35 hp. at normal

seasons and from varying grades of gasoline.

The wheels of this new model are of the wood artillery type. Standard equipment will also include electric lights, Remy ignition, ammeter, horn and battery. Alemite lubrication has been made standard on all models.

On the 1½-ton models, both on the

solid and pneumatic tire jobs, the wheelbase has been lengthened from 132 to 144 in.

The 3½ to 4-ton unit is powered with a 42 hp. engine and the 5-ton unit has a 46 hp. engine.

The light tractor has a 30 hp. engine and is made with a 120-in. wheelbase, and the heavy duty unit has a 42 hp. engine with 125-in. wheelbase. Both units are designed to work with a trailer combination.

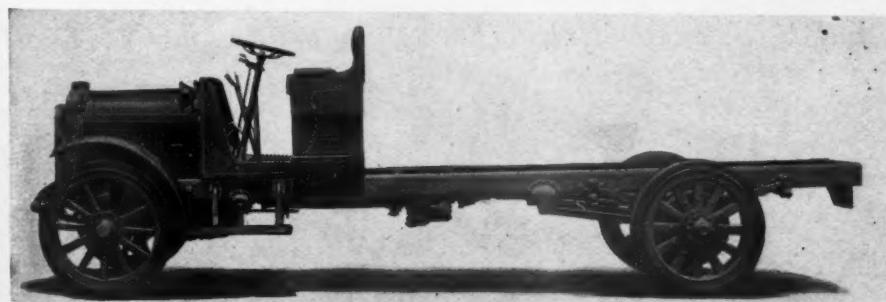
## Changes Announced in the 1923 Gramm Pioneer

**F**ROM an announcement recently received from the Gramm-Bernstein Motor Truck Co., it is noted that the following engineering and unit changes will be made in the Gramm Pioneer trucks for 1923.

The new engine of the Model 10 speed truck will have a bore and stroke of 3¾ x 5 in., respectively, and a five bearing crankshaft of liberal dimensions. Lubrication in the new engine is full force feed,

oil being circulated by a gear driven oil pump. Other features include removable head, hot-spot manifold, high sight oil gage and general accessibility. All moving parts are well enclosed. Essential parts of the rear axle have also been increased in size to counteract any overloading evil, which tendency on part of user is increasing rather than decreasing.

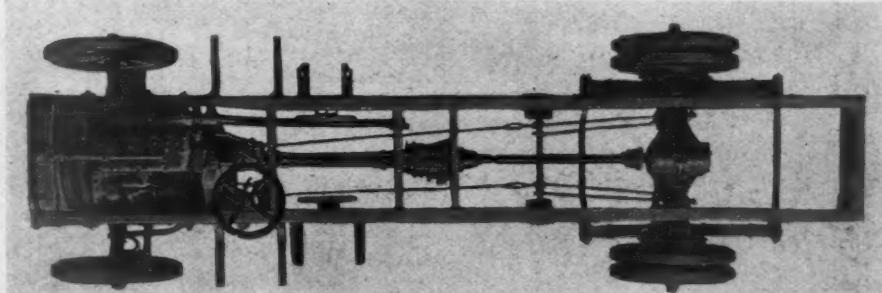
The Model 65, 1½ to 2-ton job, will include the Model J Continental, which is identical to the Model N in bore and stroke, but not the latest improvements mentioned above. While this model will continue to be regularly built with North East generator and distributor ignition from Exide battery, it will also be furnished with Eisemann high tension magneto ignition, in connection with electric lights and horn as an extra. The emergency brake, which formerly operated on the rear brake drums, will hereafter be of the ventilating shoe type and will operate on the front propeller shaft, leaving double the braking surface in rear drums available for the foot service brakes.



Federal Two and a Half Ton Model, One of New Line Recently Announced

engine speed. The crankshaft revolves on three bearings of ample dimensions. Lubrication is full force feed.

Another feature of the engine construction is the pre-heating of the gasoline mixture before it enters the combustion chambers, the water circulation being so designed that the hot water passes around the manifold. A "hot air stove" on the exhaust also assures more complete vaporization. The manifold is also equipped with three changeable adjustments for driving in summer and winter, insuring maximum engine performance at all



Showing Well-Balanced Disposition of Units in Two and a Half Ton Federal

In the Model 20, 2 to 2½-ton job, the former C-2 Continental will be replaced with the Red Seal K-4, which model also includes the aforementioned improvements. Starting, lighting and ignition arrangements are of the same provision as in the Model 65 truck. The new brake assembly applies in this model also.

In view of the increased demand for this capacity truck for use in dump work, the frame dimensions have been increased to 6 x 2½ x ¼ in., and the front end will also be provided with an integral type of channel bumper. The Gramm patent fuel economizer will now also be included in the Model 20 without extra charge.

## New Ace Motorbus Comfortably Seats 30 Passengers

THE new Ace Motorbus is described by the American Motor Truck Co., Newark, O., the manufacturer, as being sturdily constructed of the best materials and with careful workmanship. Each unit and accessory has been so designed or selected to give the most satisfactory performance and to remain in service without continuous attention. F. G. Alborn, the designer, has given this full passenger-type of chassis a low center of gravity with extra wide tread axle and dual rear wheels giving the bus maximum safety in operation and best operation under light and full load conditions.

While a passenger car type of chassis is used, extra large dimensions is claimed to provide a big factor of safety, together with the sturdy and rigid construction. The material used is 3-16 in. channel steel with riveted sections. Attention is also called to the unusually strong body supports.

The units used have been selected for their greatest suitability for Motorbus operation. The engine is a four cylinder, 4½ x 6 in. Midwest. It is guaranteed to deliver 61 hp. at 1500 r.p.m. It has ample reserve power to handle the vehicle at desired speeds, under heavy loads.

The transmission is a Brown-Lipe selective type, with four speeds forward and one reverse, the fourth speed giving a step up of 25 per cent. Other units include Timken front and rear axles, with 68 in.

tread; Brown-Lipe multiple disk clutch; Zenith non-adjustable carburetor; high tension magneto, and Remy special motorbus generator, etc. All are especially designed for this class of service.

The body is attractively finished both inside and out, and the workmanship and



Front View, Showing Low Hung Design

tread, three separate sets of braking systems, and the method of entering and leaving the vehicle.

The Model C comfortably seats 30 people with ample knee room and extra wide aisle. Standees at peak traffic periods are satisfactorily accommodated by strap hangers and the wide space between



The Body is Attractively Finished Both Inside and Out. Note Low Floor and Entrance Step

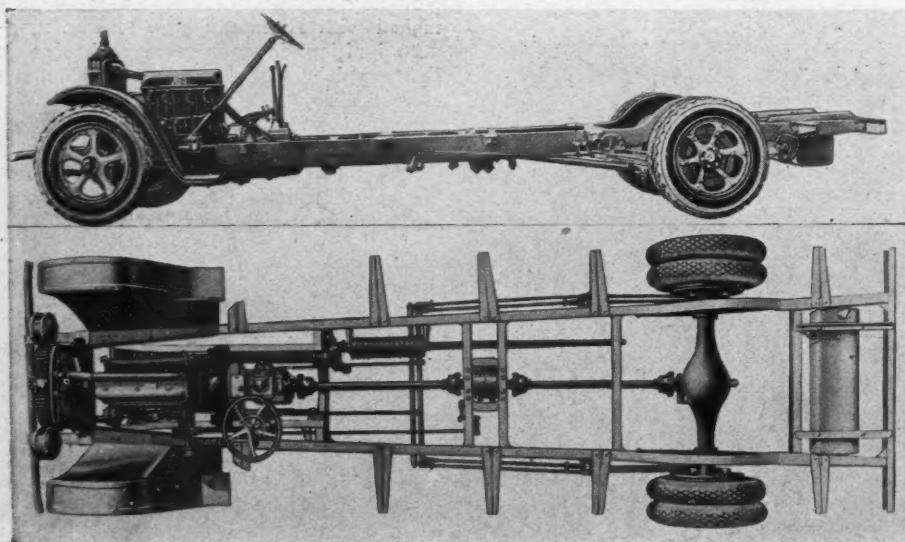
grade materials are pointed out as being such as to assure long life of coach and minimize body squeaks. All frames and sills are set in lead and marine glue.

The outstanding features claimed to assure unusual safety to the passenger are: low center of gravity with extra wide

seats. It is equipped with upholstered full interurban type seats. Special consideration has been given the comfort of the driver. The driver is given clear and unobstructed vision from all sides. He sits in a perfectly natural position and handles the bus by conveniently placed controls. A handle within easy reach controls the opening and closing of the safety doors; and the fare-box conveniently placed at the right makes possible complete operation by one man.

A low wide loading platform is provided instead of the usual step. This loading platform covers 4 sq. ft. in area. Grab handles are conveniently placed about the platform.

Special attention is called to the mounting of the engine. This is carried in a separate subframe which is said to eliminate excessive vibrations at high engine speeds. Additional comfort is assured the passenger by a special heating system giving uniform, regulated heat under all seats; unobstructed vision from all sides; with raised windows opened or closed; and large size limousine ventilators. The interior is brilliantly illuminated with eight 21-cp. lights. Push buttons are placed at each seat. A safety door at the rear is provided which is automatically controlled by the driver.



Side and Top Chassis Views of the New Ace Motorbus

## Clydesdale Announces New Models

The Clydesdale Motor Truck Co., Clyde, O., has just announced a new series of Clydesdale trucks known as Models 10, 8, 6, 4, 2, and "Oil Field Special."

The new models retain the standard Clydesdale characteristics and provide a range of sizes and wheelbases to meet almost any haulage requirement from 500 lb. up to 7 ton pay-load. Special bus models are being designed and will be offered to the trade in the near future. The principal features of the new models are as follows:

The model 10, a 138-in. wheelbase job is designed to carry 3750 lb. body and pay-load on a 9-ft. body. The  $3\frac{3}{4} \times 5$  engine is mounted in unit with the transmission; tires,  $34 \times 5$ , pneumatic cords on disk wheels; and electric lighting and self-starting system is included in the chassis price of \$1485, with bevel drive axle, and \$1535, with worm drive axle. A complete line of bodies is offered with this model.

Model 8 is built in 156-in. wheelbase and 170-in. wheelbase lengths to carry up to 6200 lb. body and pay-load, on 10 and 12 ft. bodies, respectively. Engine,  $4\frac{1}{8} \times 5\frac{1}{4}$ ; transmission, suspended amidships; and tires,  $36 \times 4$  front, and  $36 \times 7$  rear; chassis price, \$2650 and \$2700.

Model 6 is offered in 163-in. and 180-in. wheelbases and will carry up to 9800 lb. body and pay-load. The engine in this model has a bore and stroke of  $4\frac{1}{2} \times 5\frac{1}{2}$ , respectively. Tires,  $36 \times 5$  front and  $36 \times 5$  dual rear are used. Chassis price, \$3650 and \$3700.

Model 4 in 177-in. and 197-in. wheelbases is equipped with  $4\frac{3}{4} \times 6$  engine and  $36 \times 6$  front and  $40 \times 6$  dual rear tires. The carrying capacity is 12,000 lb. including body and pay-load. Chassis price, \$4300 and \$4350.

Model 2 also has a  $4\frac{3}{4} \times 6$  engine; tires,  $36 \times 7$  front and  $40 \times 7$  dual rear. Carrying capacity 17,000 lb. body and pay-load. The chassis price is \$4750 in the 176-in. wheelbase job and \$4800 in the 204-in. wheelbase job.

Continental engines, Timken axles, and Brown-Lipe transmissions used throughout.

The "Oil Field Special" is of the same general specifications as Model 6, but has a heavier frame, and unit power plant in

conjunction with auxiliary amidships transmission, providing a total of nine forward and three reverse gear ratios. Wheelbase length is 170-in. and chassis price, \$4300.

## Noble Announces New One-Tonner

On the new model A-75 one-ton truck recently announced by the Noble Motor Truck Corp., Kendallville, Ind., a few changes in units have been made over the other light models of the noble line.

The list price of this new job is \$1395 f.o.b. factory. A Clark bevel-gear axle, and a Buda  $3\frac{3}{4} \times 5\frac{1}{2}$ -in. engine instead of  $3\frac{1}{2}$ -in. as has been used in the lighter models heretofore, is used in this new model. The standard wheelbase is 130 in. It has a road speed of from 25 to 30 m.p.h. Lubri-

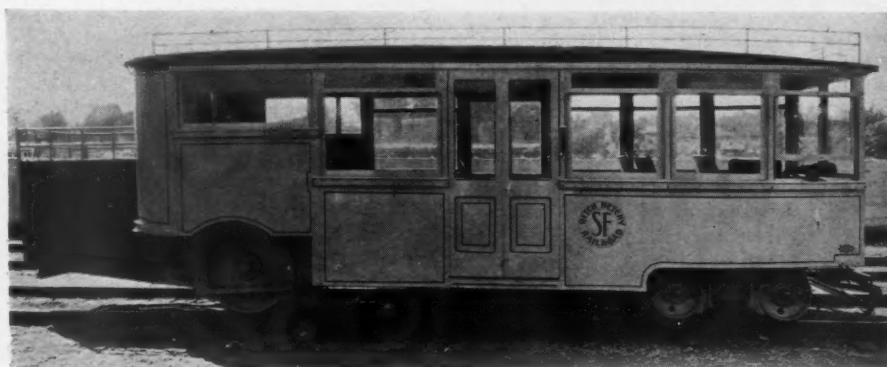
## Meister Offers New Type of Rail Car

A distinctly new type of gasoline driven rail car was recently delivered to the Hetch-Hetchy Railway, Groveland, Cal. It has many new and distinct features, both in units and construction.

The car was invented, patented and built by the A. Meister Sons Co., Sacramento, Cal. It seats 30 passengers and is built for either narrow or broad gauge railroads at a cost of \$8500.

On the Hetch-Hetchy Railroad it negotiates a 5 per cent grade 12 miles long with numerous 30 degree curves at a speed of 27 m.p.h.

Placement of the engine to the rear of the driving wheels has eliminated all revolving parts from in front of the rear axle, thereby permitting a very low hung



New Type Rail Car Used on the Hetch-Hetchy Railway, Groveland, Cal.  
It Seats Thirty Passengers

cation is by the force-feed system and cooling by centrifugal pump.

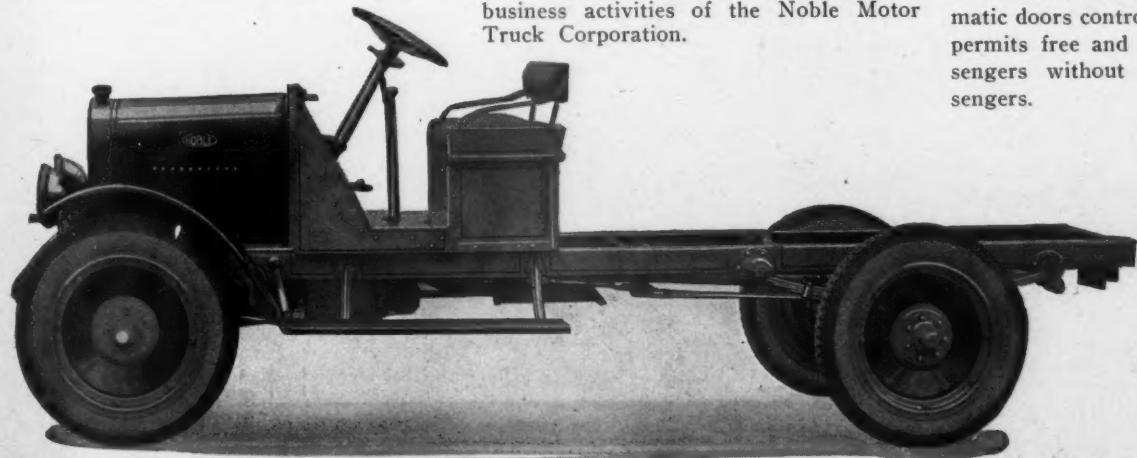
The entire job is assembled of units well known in the trade for their quality and serviceability. For more detailed information on the specifications refer to the specification columns, wherein the details of the model A-75 have just been inserted. Standard equipment includes complete electric starting and lighting with headlights, horn, dash and tail lights, tools and jack.

At a recent meeting of the stockholders of this company an issue of \$150,000 of preferred stock was authorized. This stock will bear interest at the rate of 7 per cent per annum, payable semi-annually and has been approved by the Securities Commission of Indiana. This money is to be employed for the expansion of the business activities of the Noble Motor Truck Corporation.

car and eliminating all motor noises and smoke or gasoline odors. This construction also resulted in increased passenger seating capacity without lengthening wheelbase of car. Vibration has been materially reduced and traction increased by suspending the engine on coil springs directly over rear axle on one end of a sub-frame to the main frame.

The sub-frame makes one-half of a complete truck, as it has a swivel bolster built in the main frame so that it will turn at curves. This construction eliminates flange wear and relieves side thrust. The car rides equally as well in the rear seats as in the center of car. The car complete weighs but 10,400 lb. and makes 8 miles per gal. of gasoline.

Entrance and egress are through automatic doors controlled by the driver. This permits free and easy movement of passengers without disturbing fellow passengers.



### Latest Addition to the Noble Line

It is a one-ton truck known as Model A-75 and includes units such as Buda engine, Eisenmann magneto, Stromberg carburetor, Fuller clutch and transmission, Sheldon axle, etc. The wheelbase is 130 in.

# TRUCK EQUIPMENT AND APPLIANCES



## New Long Clutch

Although not generally known to the trade, the Long Manufacturing Co., Detroit, has been in production in a new type of clutch designed for trucks of light capacity, as well as passenger cars. This clutch differs in several respects from conventional design, but embodies principles endorsed by sound engineering practice. It is the invention of E. E. Wemp, has patented features, and lends itself readily to volume production.

Three interesting features are the design of the driven members, the elimination of disk warping and the method by which heat is absorbed and dissipated. The two driven members are constructed of thin spring steel, tempered flat and held to very close limits of flatness. Instead of the general ring type, or plate, the Long disks are formed in spokes, there being six spokes to each disk, thus obtaining maximum flexibility. The friction material is riveted to either side of the disks, not to the driving members, as generally done. The driven member assembly includes a splined hub to which the driven disks are secured by six bolts. As the inner diameter of the disks at the base of the spokes is relatively small the possibility of distortion is eliminated.

No clutch brake is employed, as the design does not require it. Neither is there any adjustment provided. It is claimed that due to the extreme flexibility that any misalignment that may result from torque, assembly or wear is compensated for. The clearance between the facings is .035 in.

The third plate, center or driving member, is constructed of two plates spot welded. The inner and outer surfaces are liberal in size, and as ample means are provided for the absorption and dissipation of heat, and as radiation is practically direct, the facing material or plates are not subjected to destructive action or warping stresses. The practice of slipping

the clutch is claimed not to affect the friction material and disks. The frictional material has a wearing surface of  $\frac{1}{8}$  in. and tests conducted over a period of two years are said to show no appreciable wear.

The total spring pressure is about 1000 lb. and is obtained by six direct-acting coil springs spaced equidistant and carried in the cover plate assembly. There are six release levers, also equidistant, and the spring levers are balanced at all speeds. The levers are made of spring steel, tempered, and the fulcrum and leverage have been worked out to a nicety. The method of locking nuts is simple and effective. The pull or release pressure is about 190 lb. The release sleeve pressure is held to be below the average where the clutch pedal linkage is normal.

The clutch is carried on three square studs which are bolted to the flywheel of the engine, a suspension claimed to reduce bearing pressure to a very low point. The lightness and balance of the clutch reduces the time element in gear changing to the minimum.

As there are no adjustments to be made and as it is claimed that the facings will endure the life of the vehicle, the matter of service is simplified. The disassembly and reassembly of the components can be easily and quickly accomplished owing to their simplicity and relation to one another. Even the inexperienced mechanic should be able to make replacements due to accident or abuse. The Long clutch is in production on two types, Nos. 10 and 12. The former has a capacity of 1800-in. lb., torque and the No. 12, 2500 lb.

The Flexo Ford is the new name for the Flexo Slip Drive and Frame Extension, an attachment for changing the Ford ton truck into a 2-ton chassis. The Flexo Ford is manufactured by the Flexo Ford Co. of America, subsidiary of the Hudson Motor Specialties Co., manufacturers of the Hudson Crank Case Repair Arm.

## Federal Develops "Rut-Guard" Tire

The Federal Rubber Company, Cudahy, Wis., has just concluded its development work on a tire designed on a new idea. The utilitarian feature of this tire centers around an effective rut guard construction. As all development work was carried on in the Mid-Continental oil-fields where road conditions are lamentable, the tests to which these tires have been subjected in this region were about as grueling

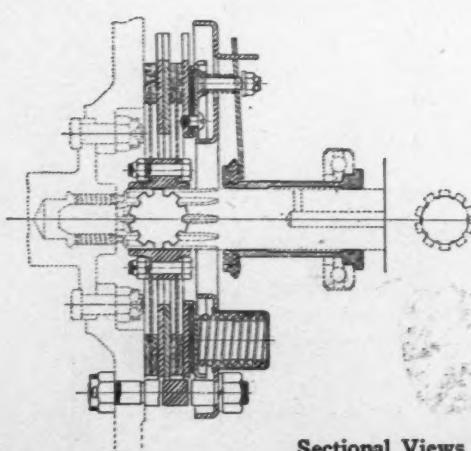


Federal's Latest, the "Rut-Guard" Tire

as could be found anywhere. According to reports these tests have proved conclusively that the tires are especially adapted for speed service, both in light delivery and bus service when negotiating in muddy weather and in the winter months for travel over the frozen roads that ordinarily wreak havoc with pneumatics.

This new tire is being built in a truck type with a rut guard extending down below the wider section of the tire. Its purpose is to give longer life when it is used in ruts, street car tracks, or rocky roads.

This tire is furnished in all sizes from 30x3½ Clincher type up to and including the 40x8 size. All Federal tires provided with the rut guard are of the truck type and are of heavier construction than the ordinary passenger car tire. Because of the heavier construction the prices range slightly higher. The Company, however, expects to ultimately lower present prices through increased production.



Sectional Views of the Long Clutch

## Positive Quick-Acting Dust Cap

The illustration shows the new Schrader dust cap with combination rim nut and bushing. The advantage of this cap is the ease and rapidity with which it can be attached and detached. A few turns of the hand to the right and the cap is screwed on to stay. To remove, simply



Schrader Dust Cap and Combination Rim Nut and Bushing

reverse the operation. The point is to always screw the dust cap on by hand, but the combination rim nut and bushing should be screwed down tightly against the felloe of the wheel with pliers or a wrench. Not only does this hold the valve stem rigid and prevents "creeping" of the inner tube, but makes it possible to quickly unscrew the cap without disturbing the rim nut bushing. It is made by A. Schrader's Son, Inc., Brooklyn, N. Y.

## Safety Air Brake

The Safety Air Brake, made and manufactured by the Safety Air Brake Co., Reading, Pa., consists of a pair of cylinders and pistons attached to the frame, one on each side of the car. A depending bracket on the brake cylinder carries a compound lever, which is connected to the arm on the brake by means of an adjustable rod.

The pistons in these brake cylinders engage the compound levers at the outer end and are actuated by burnt gases taken from one of the engine cylinders.

Upon each explosion of gas in the engine cylinder, a small part of the burnt mixture is forced into a storage tank of ample strength, which holds the pressure at the required degree of compression until it is released into the brake cylinders by the operator of the car.

As the two brake cylinders are connected to a single pressure pipe line by means of a suitable fitting, the pressure on the two pistons is perfectly equalized

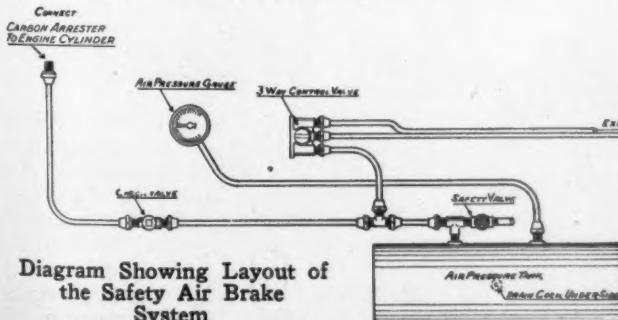


Diagram Showing Layout of the Safety Air Brake System

and the brake on each rear wheel is applied simultaneously and with the same force, thereby preventing skidding of the car in the most effective manner.

The tank pressure rises rapidly with the operation of the engine to 60 lb. per sq. in., at which pressure the safety valve is set. At 40 lb. per sq. in. tank pressure indicated on the gage directly before the operator, the pull on the brake rod is approximately 222 lb.; at 60 lb., 331 lb. The crank arm on the brake band will further multiply this pull by 6 or 8 times.

The equipment for each set of brakes is complete with all the necessary piping, couplings, check valve, safety valve, control valve, storage tank pressure gage and carbon arrestor. When these parts are properly mounted on the car there is nothing complicated to confuse the operator.

The original equipment of brake pedal and hand brake lever remain undisturbed. A small bracket of neat design, carrying the pressure gage and control handle, is mounted on the steering column below the steering wheel. An extension shaft running parallel to the steering column extends from the controller handle to the control valve below the foot board. The control valve is also bracketed to the steering column.

Brakes on trailers can be attached in the same manner and controlled by the operator as easily and as effectively as on the tractor. Zero weather has no effect on this brake as nothing about it can freeze. Our standard size of brake equipment is applicable to a wide range of sizes of cars and will brake a five-ton truck as effectively as a car of smaller capacity.

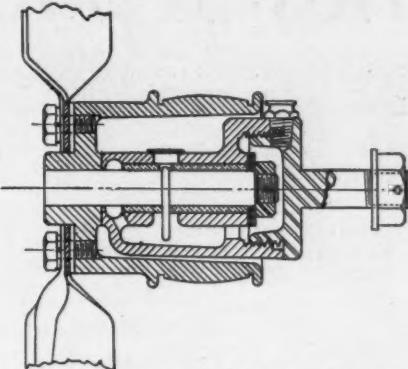
## Arrow Fan Bearing

The Arrow Pump Company, with general offices in the Buhl Building, Detroit, Mich., recently placed on the market an automotive fan, the distinguishing feature in which is the "Arrow" ring-oiled bearing.

The bearing and oil reservoir in this construction is held stationary. Only the shaft and pulley rotate. This makes it possible to insure that the lubricant will not be thrown out as would be the case where the lubricant is contained in the pulley.

Since the oil once introduced cannot escape from the reservoir in the Arrow construction and the ring delivers it to the bearing, positive lubrication is declared to be the result.

The bearing is dust-proof. The only opening in the bearing is shrouded by the pulley and a curtain of oil being constantly thrown off by the shaft into the oil



Arrow Announces Fan With Ring-Oiled Bearing

recovery space precludes dust from entering the bearing.

This bearing will be furnished with the different size fan blades complete arranged at the holding end for passenger cars, trucks and tractors.

## New Amco Lubricating System

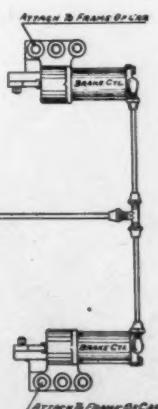
The Amco High-Pressure Lubricating System, offered by the Cincinnati Ball Crank Co., Cincinnati, O., lately taken over from the Amco High-Pressure Lubricating Co., Dayton, O., is claimed to force grease into bearings at a thousand pounds pressure.

A particular feature is the filling of the grease gun. It is accomplished by simply screwing the quick-acting nut (on the



Units of the New Amco Lubricating System

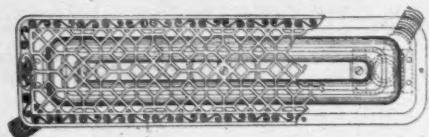
stem under the handle) out of the head, inserting the lower end of the gun in grease and pulling the handle upward slowly. After screwing the quick-acting nut into the top head, the grease is ready for use. The grease is forced into the bearings through nipples, which have patented valves claimed to make it impossible for dirt to get in or grease to get out.



The patented bent pipe connection facilitates the attaching of the gun as well as preventing breakage at this point. The Amco chuck, the piece that grips the nipples, is designed so as to insure an easy and quick attachment and prevent leakage or breakage.

### Linendoll Heaters for Winter

The "Linendoll" heater, invented and manufactured by the Norwalk Auto Parts Co., Norwalk, O., possesses many desirable features. It is so constructed that by the removal of only three screws



Views Showing Linendoll Floor Piece and Cutaway View Connections and Piping

the cover plate and heating coils can be removed from within the truck or car. This also releases a plate covering the hole in the bottom of the heater pan, the uncovering of which permits the heater to be thoroughly cleaned.

The operation of disassembling and assembling the heater can be accomplished by anyone without inconvenience in from four to five minutes, and when the heater is assembled, the intake and outlet connections come below the bottom of the pan, so there is no possible way in which the exhaust gases can escape into the interior of the vehicle. Briefly, it is simple in construction and sells at reasonable prices.

### Strom Double-Row Radial Bearings

The success of Strom double-row bearings in many installations has resulted in the addition of these bearings to the U. S. Ball Bearing Mfg. Co.'s line of single row radial, angular contact and double-row bearings.

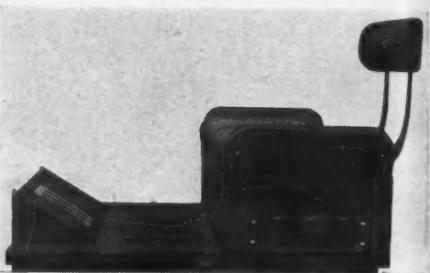
Strom double-row bearings are of two types, standard and maximum. One of the outstanding features of these bearings is the retainer construction. Two independent riveted retainers are used, one for each row of balls, thereby insuring the same strength in each retainer as obtained in the single-row type of bearings. They are especially adaptable for installations requiring unusual bearing capacity in a limited amount of space.

These bearings are designed to carry heavy radial loads. However, owing to

their construction, they are capable of supporting thrust loads also. They are especially adaptable for application to semi-floating rear wheel construction, pinion shafts and transmissions.

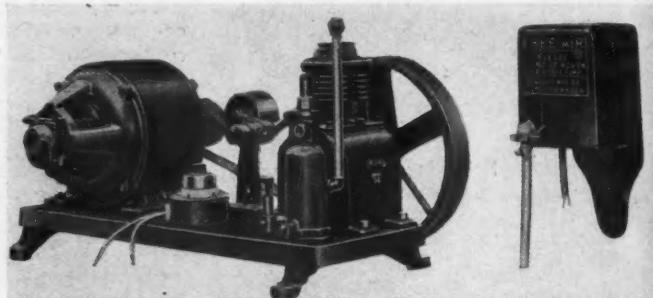
### Kellogg Curb Air System

The Kellogg curb air system, exhibited at the A. E. A. at Chicago by its manufacturer, the Kellogg Mfg. Co., Rochester, N. Y., is designed for the garage or repair shop.



Special Open Seat for Contractor Jobs

Motor and Compressor of the Kellogg Curb Air System.



The motor and compressor of this outfit is for installation within the interior of the garage or shop. And the compressed air is dispensed from a box by the patron desiring it from some convenient point, such as the curb.

One of the features of this new outfit is the fashion in which the compressor is automatically turned on. When the hook extending from the lower left-hand corner of the curb-box is released by the removal of the hose, which is hung on it when the compressor is in disuse, the compressor is automatically set in operation. It ceases only when the chuck is replaced on the hook. This set is known as the EM 52 Y. It uses what is known as the 52 compressor unit.

### Collins' Special Ford Open Seat

To present road contractors and manufacturers of dump and hopper bodies with a strong yet inexpensive open seat was the aim of the Collins Plow Co., Quincy, Ill., in bringing this product on the market. It is furnished with a two-piece spring cushion, padded lazy back, toe boards, and brackets for attaching frame to chassis. This seat can be shipped knocked-down at a reduced freight rate, as the bulk and weight is comparatively light. This company also furnishes a

filler board, which is necessary to provide protection for the dash and coil box when a chassis is equipped with an open seat or body without cab.

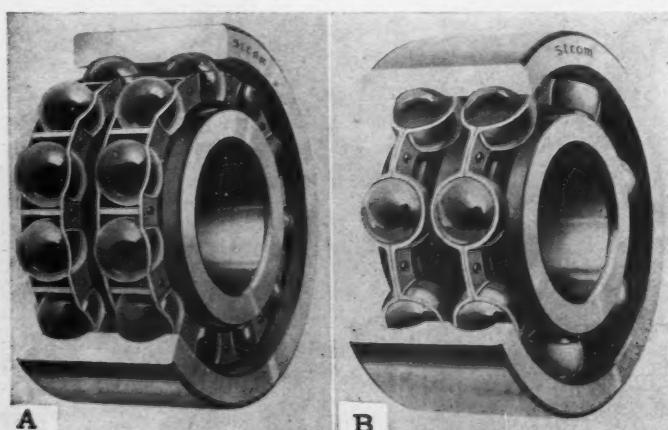
### H-P-M Hydraulic Tire-Forcing Press

The accompanying illustration shows one of the new cast frame tire forcing presses manufactured by the Hydraulic Press Mfg. Co., Mt. Gilead, O.

The outstanding feature of this press is the hydraulic lift which picks the tire up, swings it into place and takes it out again. Use of this lift speeds up production and lessens the danger to the operator. The lift is very simple and easy to operate.

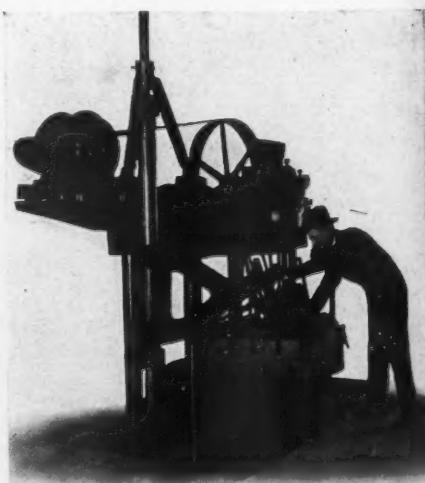
The press develops a pressure of 300 tons.

The pump is of the three plunger type with one high pressure valve and two low pressure valves. Automatic knockout valves remove all chance of mistakes made through negligence on the part of the operator. When a pressure, over which the press should not go is reached, the pump is automatically thrown off at each individual valve.



#### Strom Double Bearing

The illustration (A) is a 22-ball double-row maximum-type, radial bearing, and (B) is a 14-ball double-row, deep groove Conrad-type radial bearing.

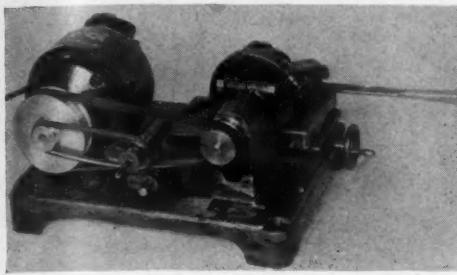


Hydraulic Press Mfg. Company's Cast Frame Tire Press

# Service Station and Repair Shop Appliances

## Franklin Model C Valve Machine

The new Model C machine recently brought out by the Franklin Machine and Tool Co., Springfield, Mass., is known as the "Service Station Special." It is designed for such shops and service stations



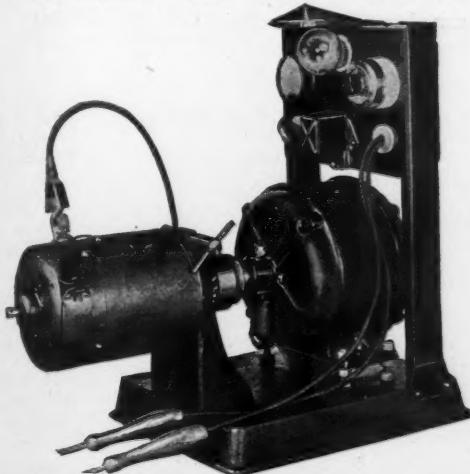
New Machine for Grinding Valves and Reseating Cutters

as require a single purpose machine to grind valves and reseating cutters only. It embodies the same mechanical principle and ideas as are characteristic of this company's model B machine.

The equipment includes a pilot, collet, cutter, wheel dressing tool and an attachment for indexing cutters. The price is \$95 f.o.b. factory.

## Onan "F" Generator Test Stand

The Onan "F" Generator Test Stand, a complete generator testing unit for Ford service stations, is the latest product of David W. Onan, 43 Royalston Avenue, Minneapolis, Minn. It is designed for



A Repair Shop Machine Valuable in a Ford Service Station

quickly mounting a Ford generator. The stand drives it as though it were in operation on a Ford at a speed of approximately twenty-five miles per hour, and holds the generator in such a position as to enable the operator to reach every adjustment, see plainly the function of the brushes, so that he can adjust them properly, and know when the generator operates correctly before again being installed.

## Volvo Rotary Converter

The Volvo Rotary Converter, No. 365, made by the Volvo, Incorporated, 803 Vinton Bldg., Detroit, Mich., is claimed to recharge 40 storage batteries at one time, thereby affecting a large saving of electric current.

The machine consists of a double wound motor dynamo. The motor side is supplied at the lighting circuit voltage and the charging current at the desired



Converter, Which Will Recharge 40 Batteries Simultaneously

voltage is obtained from the dynamo side. It is said that very little loss is incurred in the transformation and that the cost of the charging method is thereby reduced. These converters are made on application in all sizes and voltages, but only three, Nos. 365, 366 and 367, from 110 volt to 550 volt primary, are carried in stock.

## Rusco Bushing Extractor

The accompanying sectional view of the Rusco Bushing Extractor mounted in position preparatory to the removal of a bushing conveys a clear idea as to how this tool is employed. It also shows how effectively the many bevel-edged disks will grip into the bushing upon the first blow directed upon the driving end of the tool.

After the tool is inserted as shown, manipulation of the screw cap expands the disks to the proper degree, forcing the sharp edges against the bushing. After

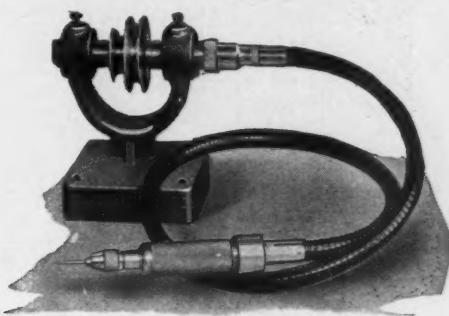


Rusco Bushing Extractor

the tool is set, hammering the butt end of the tool forces the bushing completely out. This tool, made by the Russel Mfg. Co., Inc., Middletown, Conn., is produced in three sets ranging in price from \$2.50 to \$3.50.

## Two New Weidenhoff Products

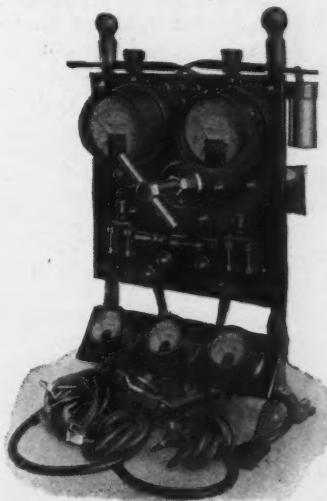
Among the various Weidenhoff products which were exhibited by Joseph Weidenhoff, 4352 W. Roosevelt Road, Chicago, Ill., at the A. E. A. show last month were two newly introduced products. One



Peerless Undercutter Complete

of them was the Peerless Undercutter, designated as item No. 995. It consists of a stand, a support for a two-speed pulley, a flexible shaft, and a handpiece with cutting burr. Only 1-6 hp. is required to operate this tool.

The other item is known as the Quick-Action Battery Tester, No. 994. This product is essentially for battery manu-



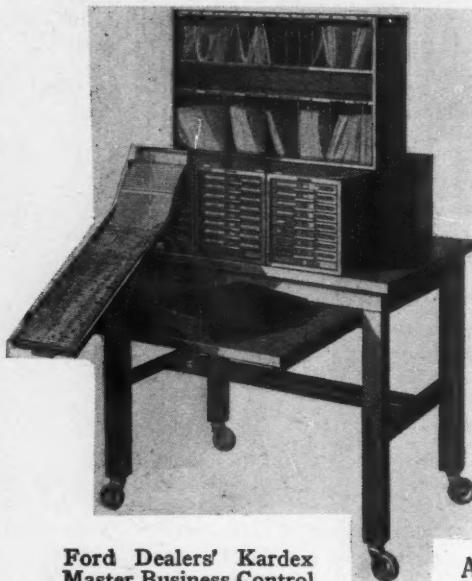
New Weidenhoff Battery Tester

facturers and distributors which test large numbers of batteries at a time. It is claimed to make all the required battery tests and make them quickly, and will show the voltage drop of three cells of each battery at the same time.

The United States leads as a source of Australian tire imports, in spite of the fact that certain United States manufacturers do all their export business to Australia from branch factories in Canada, which ranks next to France in the Australian tire trade.

## Kardex Standardized Automotive Business and Sales Systems

A most essential factor in the administration of a Ford dealer's, in fact, any business is a good record system, particularly one that minimizes detail to a nicety, insures an accurate record as to the efficiency and accomplishments of the various departments and provides a ready



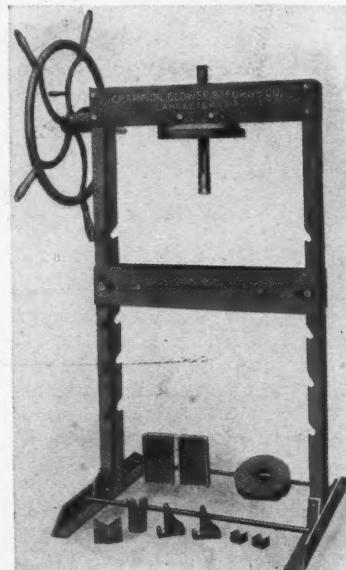
Ford Dealers' Kardex Master Business Control

passenger cars, trucks and tractors, together with the same record of used car orders and deliveries; daily and monthly sales department analysis, a unique form which records the various features of sales activities, and the same record for each individual salesman; service department analysis; summaries of new car stock inventory records for Ford and Lincoln passenger cars, trucks and tractors; and the same record of used car stock.

An "Instruction Book," in six sections which not only explains the entire operation of the systems themselves, but also includes suggested plans for operating each Department of a Ford Agency, is also provided.

## Champion 30-Ton Press

A powerful garage press with a leverage up to 1500 lb. to 1 was exhibited by the Champion Blower and Forge Co., Lancaster, Pa., at the Chicago A. E. A. exhibit. This press can also be used to straighten and pull work. The most pronounced feature is its quick-setting feat-

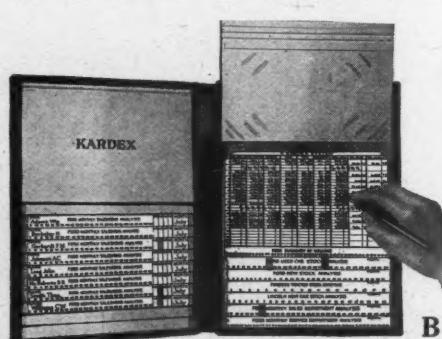


Thirty-Ton Press for Straightening and Pulling

ure, which permits ready adjustment for any kind of work. The uprights are 5-in. channels with 6 x 5/8-in. cross bars. The width is 32 in., height 65 in., and price \$80. It is sold complete with the equipment as shown in the accompanying illustration.

## Ford Has Large Improvement Program

While visiting Boston recently, in the interest of the new export terminal that is to be built by the Ford Motor Co., Henry Ford stated that his company now has a \$30,000,000 program for improvements to be completed within a year. "We won't declare any stock dividend," he said, "only the regular cash dividends, and we will spend them in the same way that we have in the past: that is on extensions and improvements."



Showing One of the Units on Which the Daily Summary is Recorded

the "Master Control" unit of this system (illustration "B"), which contains thirteen specially designed Ford card forms as follows: Daily and monthly summary of dollar volume of business transacted, payroll summary; individual new car order and delivery records of Ford and Lincoln

## Ace Aligning Gauge

The Ace gauge, made by Mark W. Jones, 53rd St. and Lansdowne Ave., Philadelphia, Pa., has been specially designed for service stations to insure accurate alignment of connecting rods, pistons, and piston pins. The column is made from close-grained cast iron, and is machined on the bottom, face and sides, which are also hand-scraped and flaked on a master plate to within .0005



Aligning Gauge Specially Designed for Service Stations.

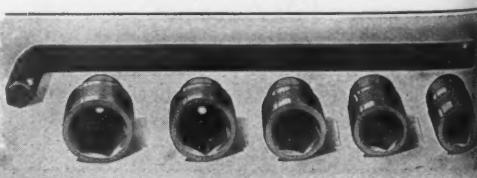
in. The spindle for bushings is made from machinery steel, hardened and ground to within .00025 in.

The aligning slide for piston pins is cast iron, machined and scraped on a master plate to insure its squareness with the column. A steel spring gib, operated by thumb-screw clamps, slides solid and can be quickly adjusted to the desired height.

## Quickway Socket Wrench Set

The Bethlehem line of accessories, manufactured by the Bethlehem Spark Plug Co., Bethlehem, Pa., has been augmented by the addition of two new items, the Quickway Socket Wrench Set, herewith illustrated, and the Snappy Cap.

The Quickway Socket Wrench, a compact tool kit, said to handle 93 per cent of the nuts on all vehicles, including Fords, comprises a hexagonal double-ended wrench, turned from solid bar steel of high-carbon test, accurately broached and cyanide-hardened, and five sockets  $\frac{1}{2}$  in.,  $\frac{5}{8}$  in.,  $\frac{3}{4}$  in., 11-32 in. and  $\frac{3}{4}$  in. The entire outfit comes in a neat black leatherlike case.



Showing the Quickway Socket Wrench Set Complete With 5 Sockets

### New Weaver Hi-Speed Press

Greater speed, especially on work that does not require extreme pressure, is one of the main characteristics of the recently developed press of the Weaver Mfg. Co., Springfield, Ill. One of its exclusive mechanical features is its rack and pinion construction which permits instant release-



Showing How the New Weaver Hi-Speed Press is Used

ing of pressure, regardless of the amount, by one reverse stroke of the lever.

The construction is simple. The pinion to which the lever handle is attached meshes into a sleeve over the press screw. This sleeve is attached to the thrust bearing plate so that by operating the lever handle to the right, the hand wheel and screw are lowered as a unit approximately 2 in. This construction is claimed to prevent the throwing of undue strain on the screw which would occur if the pinion operated directly on the threads of the screw. A heavy tension spring counterbalances the weight of the hand wheel

end screw and greatly facilitates operation of the lever handle.

Where a comparatively light pressure up to 2000 lb. is sufficient, the rack and pinion can be used. Delicate work can be handled to special advantage with this leverage, as the operator can quickly feel when the right amount of pressure has been reached.

Should it be necessary to exert a greater pressure than can be supplied with the rack and pinion, the screw can be instantly spun down into contact with the work by means of the hand wheel and the ratchet lever thrown into engagement. This ratchet arm has two adjustments which provide leverages of 1500 to 1 and 3000 to 1 respectively.

Thus work requiring pressure from 1 lb. to 60,000 lb. can be handled without moving the work after it is properly placed in position under the screw.

### Waller Valve Grinding Machine

One of the latest products of the Waller Mfg. Co., Oelwein, Iowa, is a new machine that is declared to grind the valves of any overhead valve engine with removable head.

When the cages are removable a jig is used and the cages are turned upside down and held in position under the drivers in a jig. The handle, marked A in the accompanying illustration, raises and lowers the whole grinding apparatus to the required depth of the block. The casting, B, is employed as a guide and contains a spring which keeps tension on the springs while being ground. The carriage holding the blocks is moved back and forward, for aligning the valve ports under the driver, by a handle designated in the illustration by C. A slot in the cross member permits adjustment for different widths of blocks. Adjustment of the drivers for different spacing between

the valves is provided by slot E. The lever F is tripped by the studs G on the gear and operates a camshaft which trips the valves every 20 sec. The gear rack I is driven by the lever H. This gear rack drives back and forth, turning the valve, and is so geared and operated that it changes the stroke every revolution. On the longest stroke it turns the valves  $1\frac{1}{2}$  revolutions and on the shortest stroke,  $\frac{1}{4}$  of a revolution. This permits the valves to be ground without streaking them and a full set of twelve valves to be ground in the time ordinarily required in grinding one by the old style hand method. Adjustment is also provided for different length blocks. It is designated in the illustration by J.

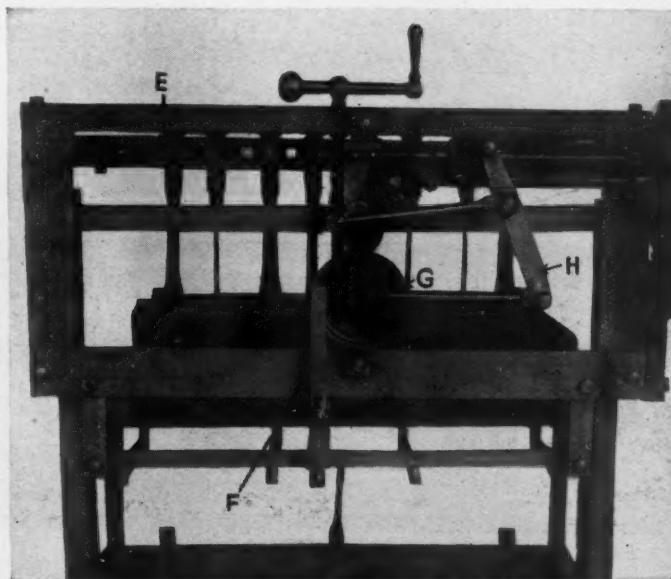
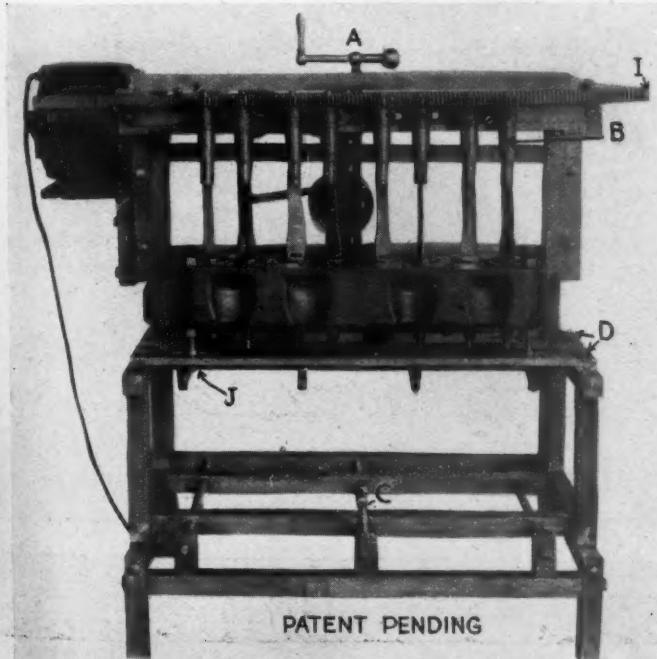
### Universal Joint Tongs

The Stevens Universal Joint Tongs, recently included in the large list of special tools of Stevens & Co., 375 Broadway, New York City, are designed to give perfect control in slipping a Ford universal joint into place. The value of a special tool for this particular operation in Ford



Special Ford Universal Joint Tongs

repair work can be readily appreciated by the repairman acquainted with the difficulty of inserting the joint into place with the fingers or with an ordinary pair of pliers. These tongs are claimed to reduce the job to a very simple operation. The list price is \$1.75.



Front and Rear Views of the Latest Waller Product  
It is a new machine that is claimed to grind the valves of any overhead engine without removing the head

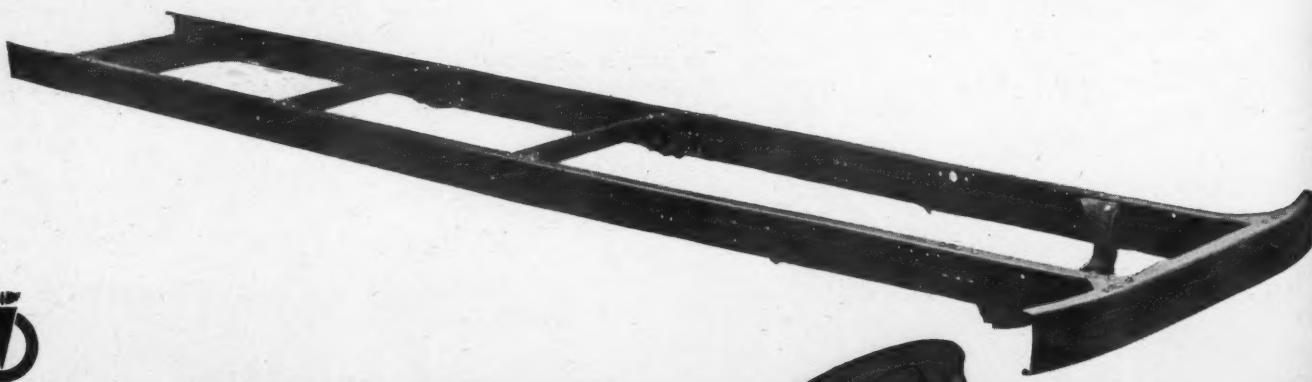


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# THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879

Vol. XXIV PHILADELPHIA, FEB. 15, 1923 No. 6

Published the 15th of each month by the

**CHILTON COMPANY**

Market and 49th Streets

Philadelphia, U. S. A.

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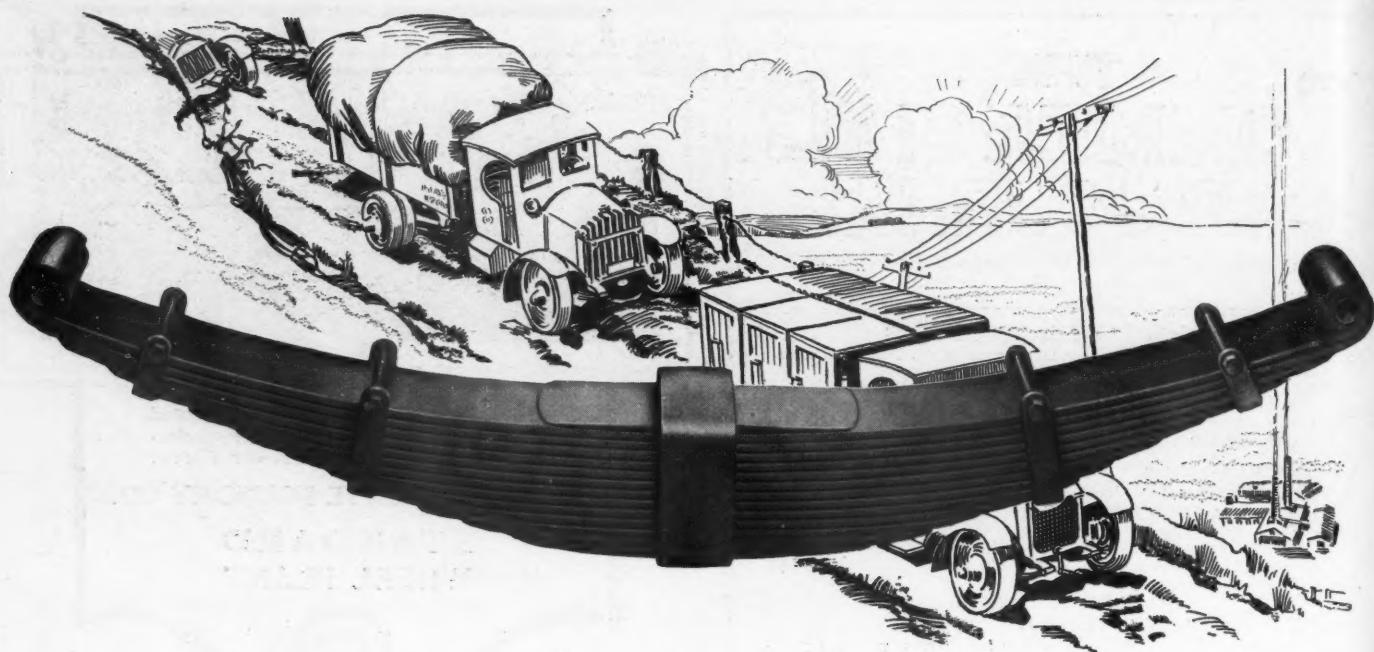
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